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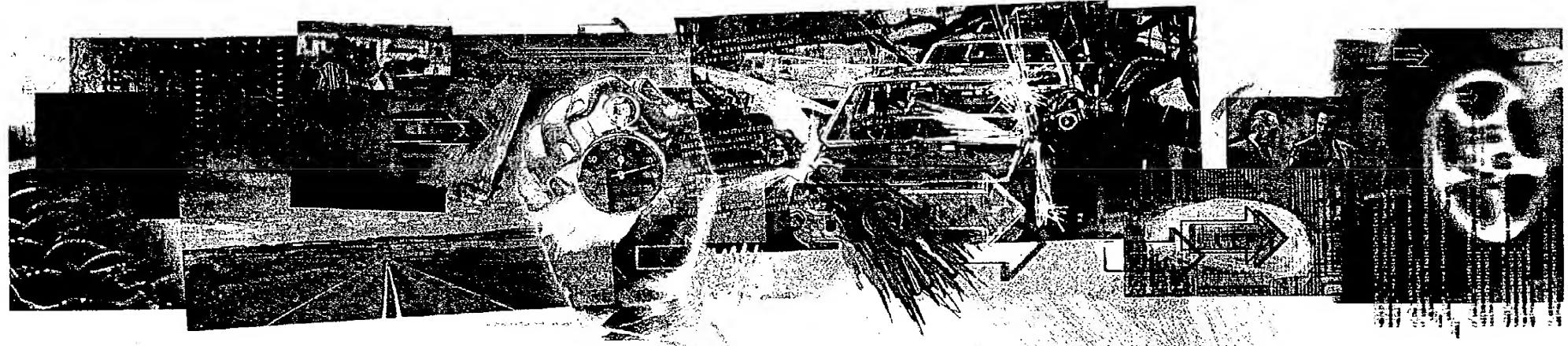
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aftermarket planning



RHYTHM® Aftermarket Planning helps automotive suppliers better manage their aftermarket business. With RHYTHM, suppliers can more effectively plan distribution, forecast demand and replenish inventory, especially when producing both OEM and aftermarket products in the same manufacturing facilities. The result is increased aftermarket service levels while actually carrying less inventory.

problem: two competing demand sources

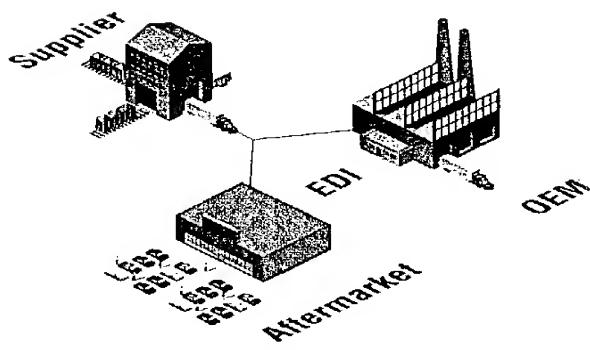
Most automotive suppliers must plan manufacturing based on two competing demand sources, each with its own volatility. On one hand, vehicle manufacturers issue JIT replenishment signals with product mix changes. On the other, the aftermarket distribution network generates reorder signals impacted by seasonality, promotions, weather, and the inherent volatility found in high numbers of low volume SKUs.

These varying demand streams compete for the same limited product inventory and production capacity. Because missing an OEM ship date can cause significant penalties and potentially the loss of a long term contract, meeting OEM demand almost always comes first. Yet inadequately servicing the high margin aftermarket can significantly impact a supplier's profitability.

solution: integrated planning for competing demand sources

RHYTHM Aftermarket Planning is an integrated environment that enables suppliers to take full advantage of aftermarket demand, while still meeting OEM commitments. It gives planners the ability to globally optimize inventory and capacity and rapidly respond to change. It includes three integrated parts: demand planning for better forecasting, supply chain planning for improved inventory allocation, and manufacturing planning and scheduling to optimize production.

aftermarket planning



Most automotive suppliers must plan manufacturing for two competing demand sources, OEMs and the aftermarket.

continued

Demand planning features the ability to build detailed forecasts at each local distribution point. Rather than simply rolling forward aggregated national demand, local forecasts are created based on sales history, seasonal trends, promotions and even part failure histories and warranty notices. The result is much more accurate demand forecasts.

In supply chain planning, target stocking levels are set and inventory deployed across the distribution network. Planners address shortages, monitor chronic over/understocks, and rebalance inventories between locations. They can make dynamic sourcing decisions using alternate or multiple distribution paths. They can allocate constrained supply to priority markets and customers according to predetermined business strategies. They also enjoy a rapid "what-if" planning mode and a fast, real-time environment to see the immediate impact of changes such as new orders.

In manufacturing planning and scheduling, planners merge aftermarket demand with OEM demand, and perform concurrent master planning for capacity and materials. Advanced optimization techniques maximize throughput and increase material flow velocity. The same integrated environment handles both aftermarket demand and manufacturing, to insure improved collaboration and global visibility between manufacturing and aftermarket operations.

benefits: cost-effective coordination

Without increased working capital or investment in new plant and equipment, suppliers are able to attain incremental aftermarket revenue and higher service levels. Specific benefits include:

- **increased service levels**—Typically 20 percent higher customer order fill rates which capture perishable demand, retain customers who are potential "walk aways", and distribute more products to existing customers.
- **reduced inventory**—Typically 15 percent less inventory across the entire distribution network, including central distribution centers, hubs and spokes.
- **reduced planning cycle time**—Typically a 75-80 percent reduction in planning cycle time with increased time for value-added activities such as creating "what-if" scenarios.

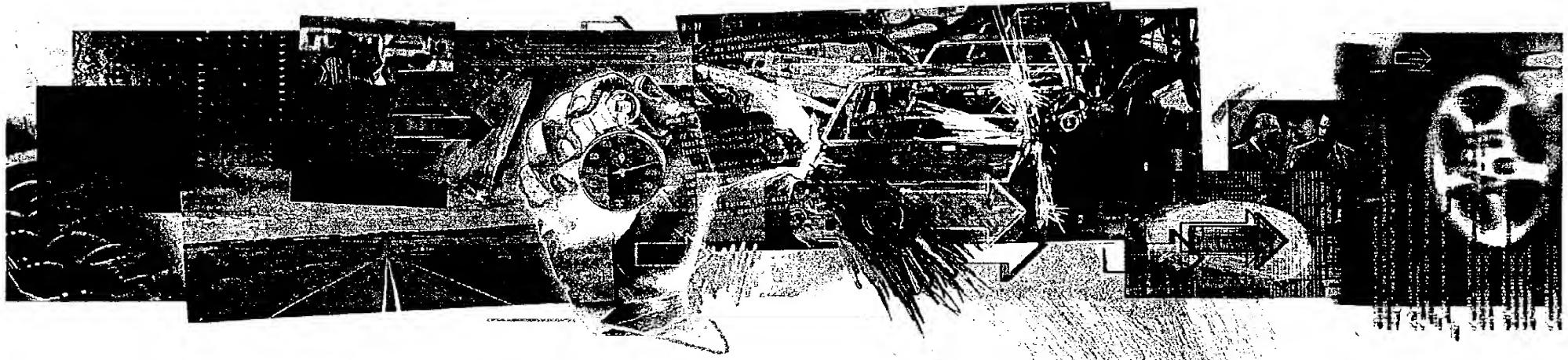


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inbound transportation management



RHYTHM® Inbound Transportation Management enables manufacturers to manage and optimize inbound transportation operations to provide 100% service levels at the lowest possible cost. With this solution, logistics organizations enjoy global visibility of operations, advanced warning, and the ability to respond to problems before they become difficult and expensive to solve. They can optimize shipping plans, monitor scheduled activities, and respond to unexpected events.

problem: avoiding expediting costs

Lean manufacturing has driven excess inventories out of plants, leaving little room for error in delivering critical components. This puts more demands on transportation management. Transportation is more constrained and difficult to optimize, causing inefficiencies that may add up to millions of dollars per year. With little safety stock, transportation problems can also trigger potentially costly delays. The cost of line stoppages is intolerable; up to \$20,000 in lost revenues/minute at vehicle assembly plants. Yet expediting to avoid such delays via emergency and premium freight services is also extremely expensive.

solution: increasing visibility and responsiveness

RHYTHM provides a decision support system that plans and optimizes transportation operations across the supply chain. It employs an advanced architecture for integrating data across different business enterprises. RHYTHM also provides a full spectrum of transportation planning capabilities, ranging from long-range strategic decision making to short-term execution monitoring.

Strategically, RHYTHM models product flows and associated costs, capacities and service constraints along the entire length of the supply chain. This allows planners to evaluate tradeoffs and make good strategic decisions such as identifying the best location and transportation scenario for a sub-system assembly or kitting operation.

inbound transportation management

continued

Operationally, RHYTHM creates executable transportation plans that consider constraints and costs. This includes managing complex logistics scenarios such as multi-tier in-sequence shipping.

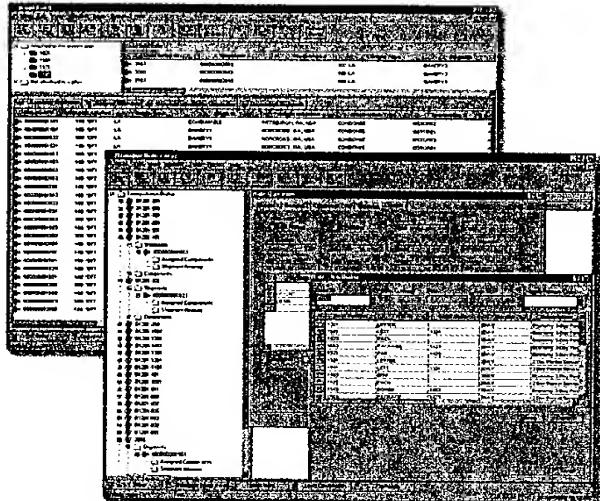
RHYTHM develops transportation plans with data from manufacturing plans and vice-versa. Freight optimization cuts logistics costs and time in accordance with Just-in-Time strategies, including "milk run" route planning. RHYTHM's delivery optimization considers load building rules, alternate routes, alternate modes, consolidation points and cross docking operations.

At execution, RHYTHM offers a command and control capability for monitoring multi-mode, multi-enterprise logistics operations. Logistics managers gain visibility of inventory moving through the supply chain and in-process manufacturing orders. Interactive graphical models monitor and measure the performance of the individual elements of the supply network. Execution failures generate visual alarms. These alarms alert users that the plan is in jeopardy and enable them to proactively analyze alternatives. This ability is particularly useful to companies that have outsourced logistics, but want visibility into operations they don't operate and control.

benefits: improved service while reducing cost

Using RHYTHM, manufacturers can simultaneously maintain or raise customer service levels while reducing total inventories and total costs.

- **reduced transportation and inventory costs**—A customer using i2's cross docking functionality eliminated 10-12% of its total transportation costs and 15% of total inventories.
- **optimized throughput**—A manufacturer reduced by 30% the number of carriers arriving at its receiving dock and significantly reduced in-bound shipment handling costs.
- **increased productivity**—Transportation and logistics functions are executed in a fraction of the time required using manual or spreadsheet methods. One manufacturer reduced total transportation administrative costs by 15%.



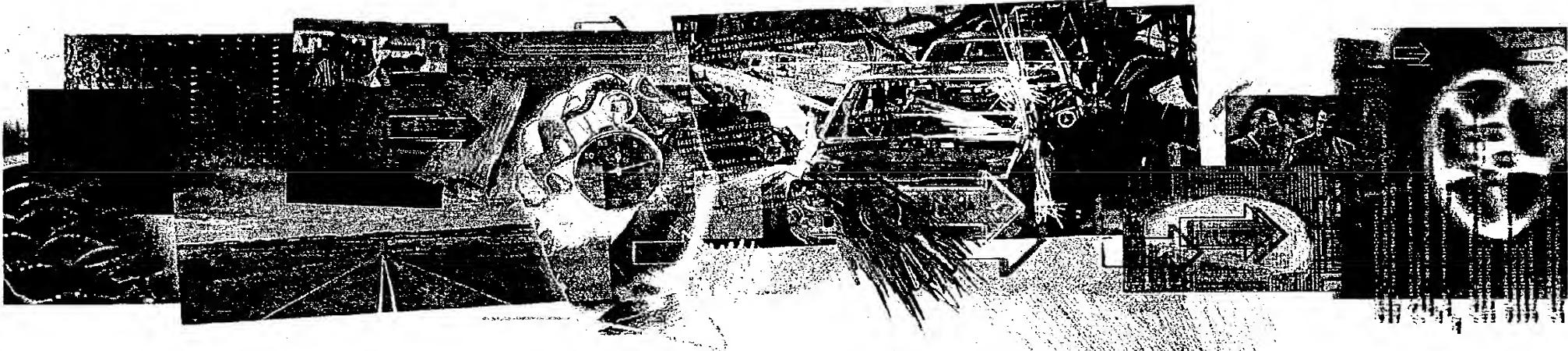
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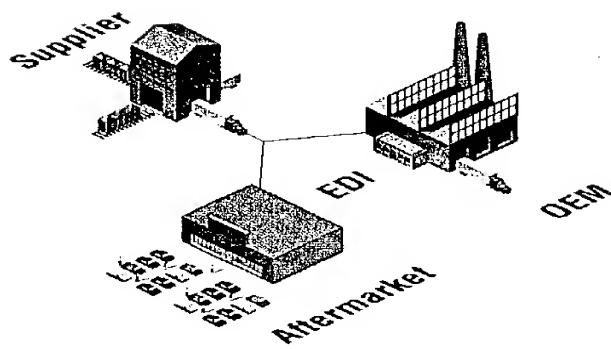
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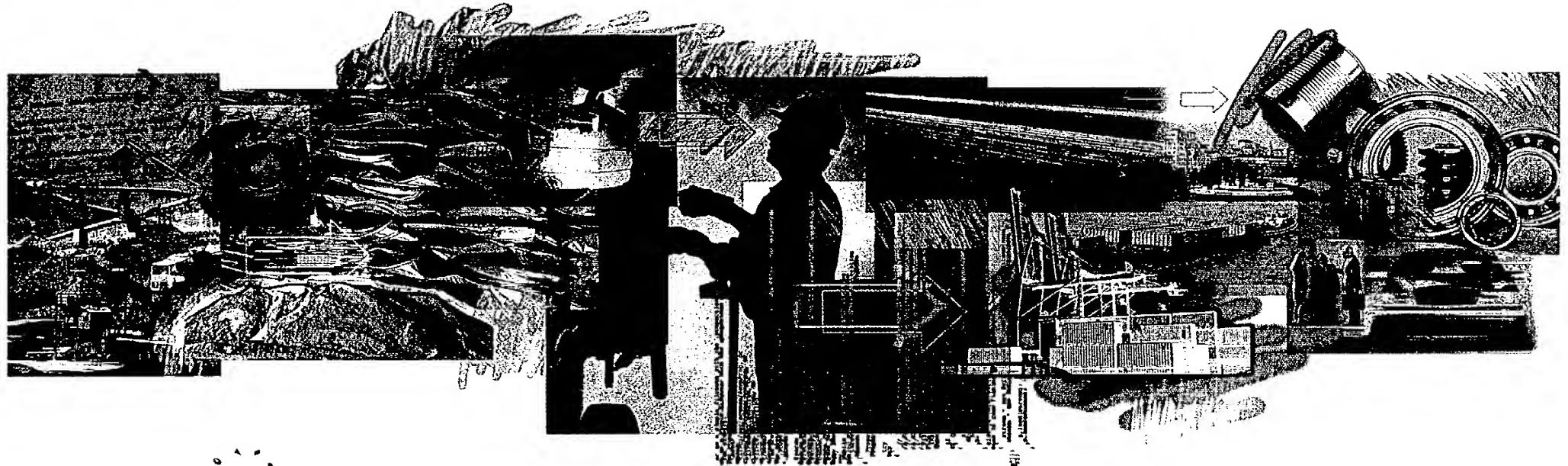


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material allocator



RHYTHM® Material Allocator™ is one of the modules of the RHYTHM tightly integrated solution for Metals. RHYTHM Material Allocator optimizes the use of in-process material by determining the allocation of material to orders. RHYTHM Material Allocator considers process restrictions and customer requirements in order to provide the best allocation of material to minimize overall material inventory.

fundamental planning principles

RHYTHM Material Allocator was developed with the objective of determining the best allocation of in-process material to customer orders. RHYTHM Material Allocator provides value in situations such as finding:

- the best match between all unfilled or partially filled orders and all unallocated material
- the best match between all unfilled or partially filled orders and all material (total reallocation)
- material to fill an emergency order
- orders that could use a specific material
- why an order could not use a material
- why material could not fill a desired order

RHYTHM Material Allocator can help to meet customer commitments while minimizing inventory.

material allocator

continued

RHYTHM Material Allocator solves complex problems

The effective use of material in a Metals plant is a complicated problem. The characteristics of the material, such as length and width, and the metallurgical properties and finish attributes must be compared to the product requirements to determine if there is a match. The material may be in-process so the potential match must be between it and the intermediate material that is required to make the final product. Also, in-process material may be able to be changed, such as through cutting or slitting, so that it meets a final product specification. RHYTHM Material Allocator takes all of these constraints into account when determining the best allocation of material to orders. RHYTHM Material Allocator will help you to meet customer requirements while minimizing inventory.

optimized allocation

RHYTHM Material Allocator uses a 'state-of-the-art' optimization technique based on a powerful and fast genetic algorithm. This approach globally optimizes based on a balance of all constraints and can handle both complex constraints and a very large number of constraints.

use what you have, quickly!

A powerful to use, yet simple graphical user interface (GUI) gives important information allowing the user to evaluate and understand how and why to assign stock and orders. This might be very useful, for example, when an emergency order is received and it needs to be fulfilled ASAP.

understanding the options

RHYTHM Material Allocator features powerful 'what-if' capabilities to assist in making decisions. Color coding gives a fast view of what matches and what doesn't, for both orders and material. Reports can be generated that sort the data a variety of ways, including using filters that take you right to what you want to see.

systems integration

As part of the RHYTHM product suite, RHYTHM Material Allocator works with other RHYTHM products to provide a seamless production management system. RHYTHM Material Allocator can also be quickly and easily integrated with enterprise resource planning (ERP), legacy and shop-floor based transaction systems.

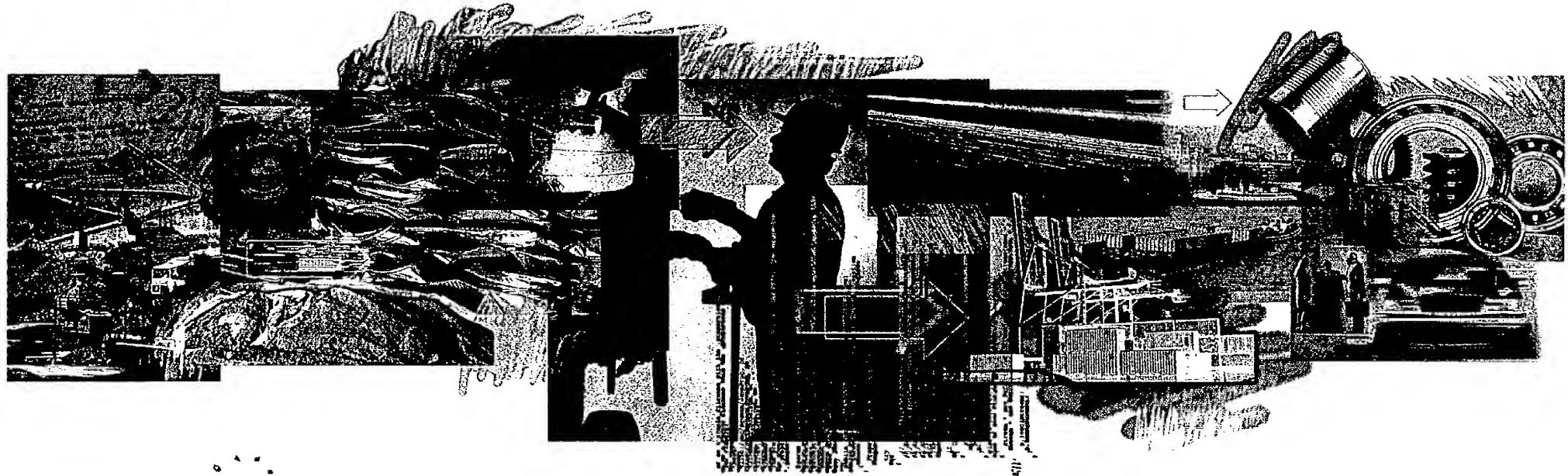


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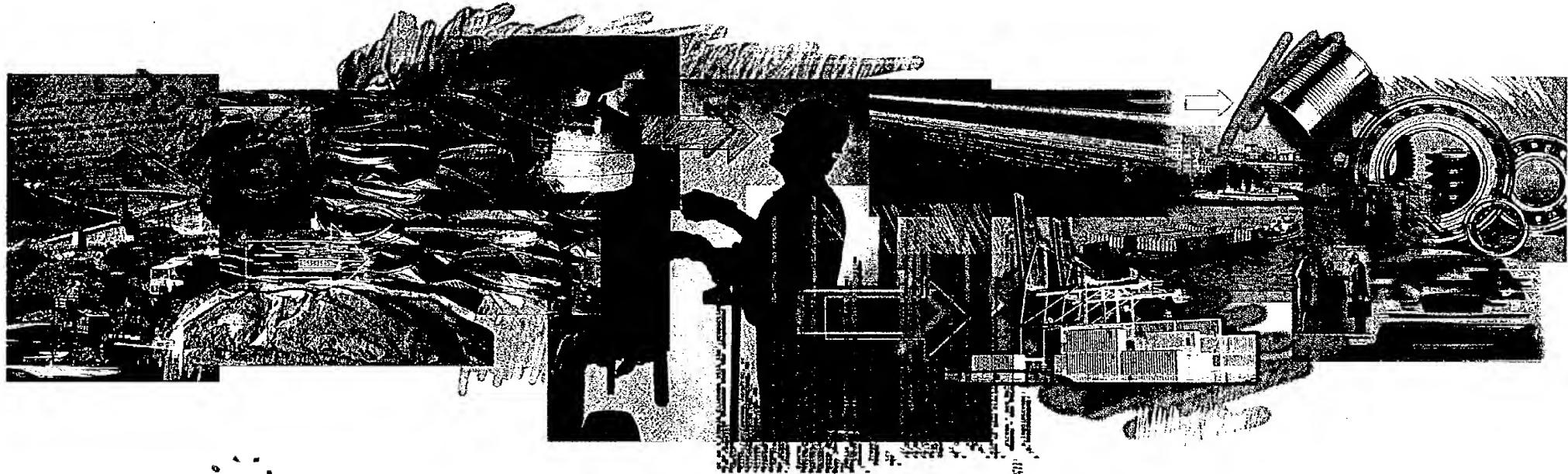


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master planner



RHYTHM® Master Planner™ is one of the modules of the RHYTHM tightly integrated solution for Metals. Master Planner helps to create a master plan for the entire supply chain—one that determines when, where and in what quantity to purchase, produce, ship and store raw material, intermediate inventory and finished goods in order to meet customer demand and inventory targets. RHYTHM Master Planner enables a Metals company to synchronize its sales, production, distribution and transportation objectives, driving operational and executional level planning activities.

fundamental planning principles

RHYTHM Master Planner is unique because it models the entire supply chain—with the flow of all major activities, and related constraints, represented within a single model. By modeling the entire supply chain at a macro or aggregate level, planners can understand how the total supply chain operates and see how its functional components interact under different conditions. RHYTHM Master Planner's ability to view all activities concurrently enables planners to synchronize the entire supply chain at an enterprise level, which helps them create a plan that meets the global business objectives.

RHYTHM Master Planner solves complex problems

The primary function of RHYTHM Master Planner is to balance unconstrained demand against the supply chain's constraints to maximize business objectives. To accomplish this, planners need to make intelligent decisions about the supply chain.

- Which factory should make what products?
- How should scarce raw materials and capacity be allocated?
- Which transportation modes should be considered?
- What is the impact of alternative strategies for all of the above?

master planner

continued

RHYTHM Master Planner helps a metals company to accept the right business—based on a defined market allocation and reservation criteria as opposed to first-come, first-served, which is typically used today. The result is a longer-term plan that meets both operational and financial objectives.

powerful solving capabilities

RHYTHM Master Planner's solvers are configured in a way that allows you to prescribe objectives in a customizable sequence reflecting your preferences. Consider two conflicting objectives such as the following—satisfy all demand (if possible) but avoid using overtime (if possible). In many cases, the first objective is more important since it concerns customer service. However, the second is still important because it affects costs. RHYTHM Master Planner allows you to use "real" metrics in specifying the trade-offs between the two so that alternatives can be compared and the best option chosen.

unique features of RHYTHM master planner

- **advanced mathematical optimization**—proven, advanced mathematics ensure objectives are optimized to match business requirements.
- **resource allocations**—to production locations and production lines in a way that ensures scarce capacity is consumed in an optimal manner.
- **inventory builds**—when required to satisfy high seasonal demands.
- **trade-offs**—between overtime production and building inventory.
- **flexible sourcing**—of distribution centers from multiple production locations.

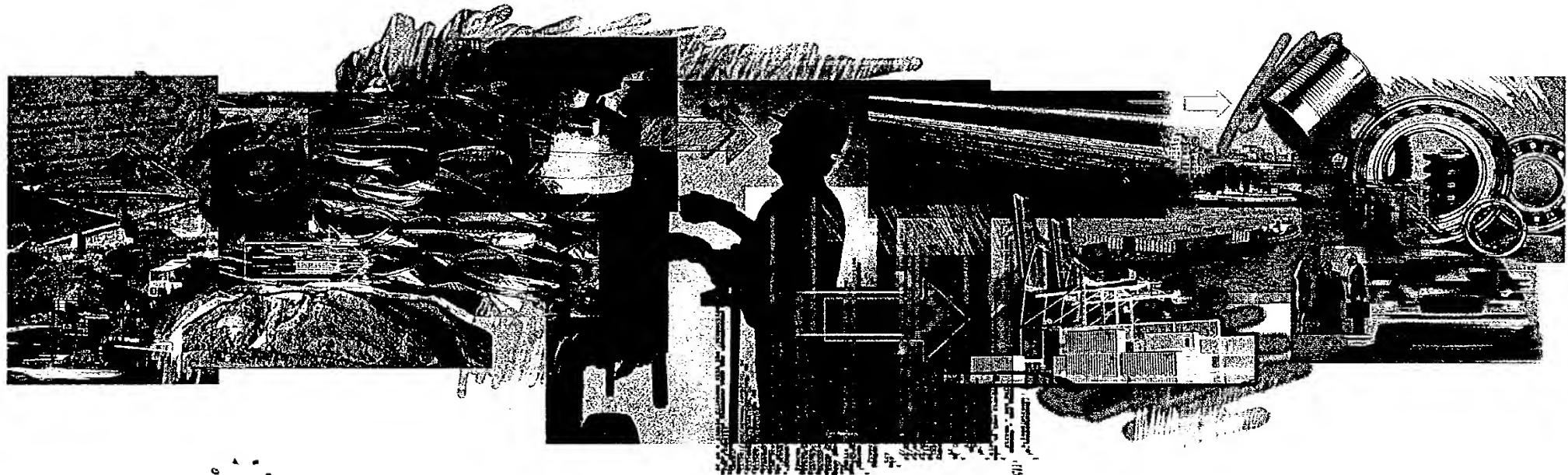


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logistics scheduler



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fundamental planning principles

In order to optimize the transportation of products to customers, RHYTHM Logistics Manager employs powerful mathematical solvers and real-world information about costs and constraints. This combination provides managers with the flexibility and decision support tools needed to create schedules to ensure that products are shipped to customers on-time at the least possible cost.

RHYTHM logistics scheduler solves complex problems

Transportation Managers in Metals companies face many challenges in the process of trying to ship products to customers. Simultaneously achieving the lowest cost while providing the necessary levels of customer service is very difficult. To enable this, RHYTHM Logistics Manager considers a variety of constraints including details about the customer (delivery location, receiving restrictions), due-date of the order and mode of transportation. The Logistics Scheduler will also consider loading restrictions in the Shipping Department such as the number of trucks that can be loaded per day, the loading sequences and the constraints for each loading bay. This information, combined with the details about the various transportation options including timing and costs, is used to determine the best shipping schedule.

logistics scheduler

continued

resolve conflicting priorities

RHYTHM Logistics Scheduler respects a variety of conflicting priorities and objectives. Efficient loads must have the proper balance of volume and weight utilization. High priority items may need to be shipped earlier in the working day. Handling efficiency improves when the building of loads is taken into account ahead of time. Sometimes multiple transportation sources or destinations should be considered to ensure a full-load shipment, but too many sources or destinations create additional complexity and cost. Frequently, to fill up a load, it makes sense to ship items before it's absolutely necessary—but pulling ahead too far or pulling ahead the wrong item can cause problems that ripple throughout the supply chain. RHYTHM Shipment Scheduler makes sense out of all this chaos and saves you money in the process!

unique features of RHYTHM logistics scheduler

- **advanced mathematical optimization**—Proven, advanced mathematics factor both service and cost issues into transportation planning and scheduling.
- **full, balanced loads**—Minimize transportation costs by creating full loads with the proper balance of weight and volume.
- **prioritized loading**—Ensure items required to meet demand are loaded before items needed to maintain inventory targets.
- **handling efficiency**—Improve efficiency by planning the storage of finished goods and the building of loads.
- **multiple capacity constraints**—Load restrictions specified by weight, pallet or volume.



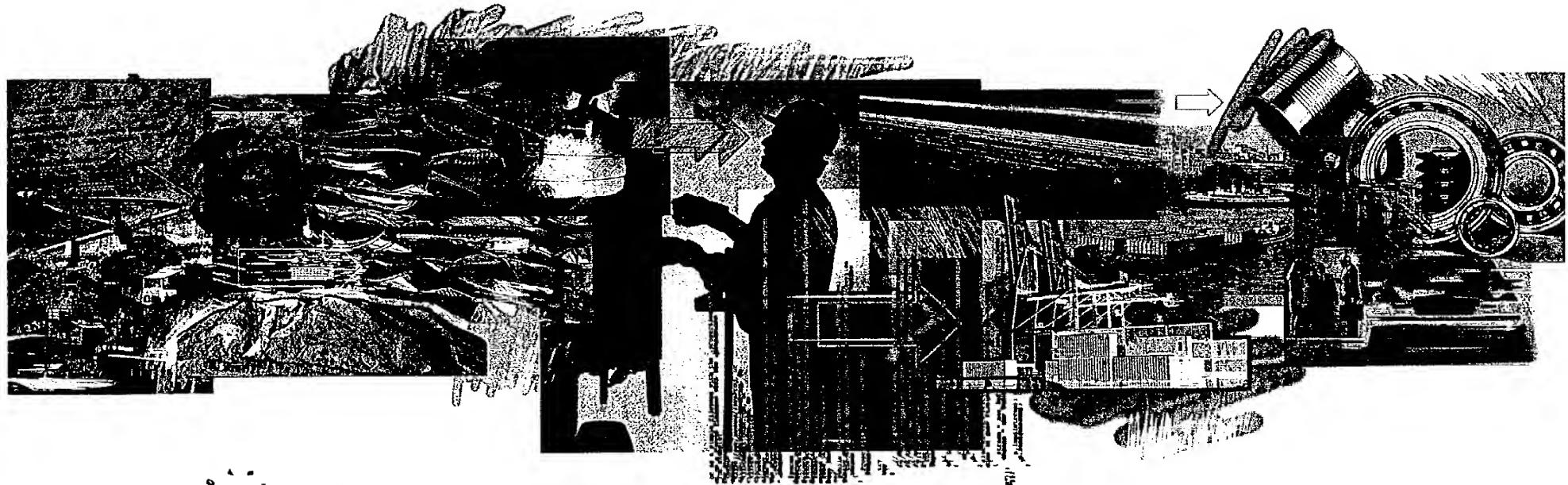
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continued

resolve conflicting priorities

RHYTHM Logistics Scheduler respects a variety of conflicting priorities and objectives. Efficient loads must have the proper balance of volume and weight utilization. High priority items may need to be shipped earlier in the working day. Handling efficiency improves when the building of loads is taken into account ahead of time. Sometimes multiple transportation sources or destinations should be considered to ensure a full-load shipment, but too many sources or destinations create additional complexity and cost. Frequently, to fill up a load, it makes sense to ship items before it's absolutely necessary—but pulling ahead too far or pulling ahead the wrong item can cause problems that ripple throughout the supply chain. RHYTHM Shipment Scheduler makes sense out of all this chaos and saves you money in the process!

unique features of RHYTHM logistics scheduler

- **advanced mathematical optimization**—Proven, advanced mathematics factor both service and cost issues into transportation planning and scheduling.
- **full, balanced loads**—Minimize transportation costs by creating full loads with the proper balance of weight and volume.
- **prioritized loading**—Ensure items required to meet demand are loaded before items needed to maintain inventory targets.
- **handling efficiency**—Improve efficiency by planning the storage of finished goods and the building of loads.
- **multiple capacity constraints**—Load restrictions specified by weight, pallet or volume.

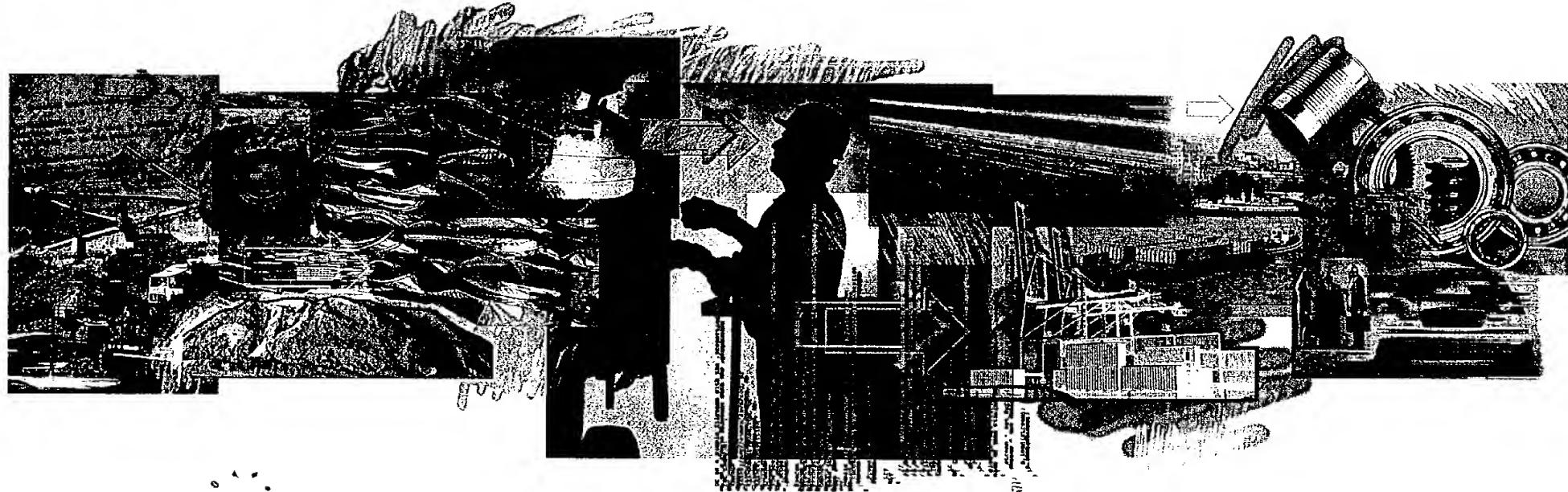


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factory planner



RHYTHM® Factory Planner™ is one of the modules of the RHYTHM tightly integrated solution for metals. It is the “core” of the metals solution around which other modules are built. Factory Planner takes a global approach to intelligently optimize the performance of a metals manufacturing operation. RHYTHM Factory Planner simultaneously manages dynamic material and capacity constraints to develop a feasible operating plan for plants, departments, production lines and work centers. The resulting plans meet the company’s business objectives and the customers’ delivery requirements.

fundamental planning principles

With its global visibility and constraint management capabilities, RHYTHM Factory Planner creates feasible plans that reflect real-world manufacturing conditions. The resulting production plan can be used to meet a variety of objectives such as improving due-date performance, cutting lead-times, improving throughput and reducing inventory and operating expenses. Factory Planner encourages extensive “what-if” analysis and makes it easy to respond to changing conditions on the shop floor.

RHYTHM Factory Planner solves complex problems

RHYTHM Metals Factory Planner manages complex manufacturing operations that involve a large number of resources and operational steps in real-time. Factory Planner also solves common planning problems found in metals plants such as managing a complex flow of material, alternate routings and optimizing machine groupings and cycles. The result is an intelligent, feasible production plan along with the associated set of manufacturing and purchasing requirements. The RHYTHM Metals Factory Planner can be used in conjunction with the Mill Scheduler suite of products to determine the optimal sequence of operations at each resource.

factory planner

continued

problem-oriented planning that enables immediate resolution

Factory Planner enables planners to instantly "drill-down" into the details of a problem by using point and click actions. Situations such as capacity overloads, material shortages and late orders can be pinpointed and resolved. This capability goes beyond simple exception-based reporting which only identifies problems, but cannot resolve them.

comprehensive support for both finite and infinite capacity planning

Infinite capacity planning is an important step in formulating an optimal, finite capacity plan. Initially, Factory Planner creates a plan that considers finite materials but infinite capacity to illustrate the ideal level of resource capacity needed to meet customer demand. In infinite capacity planning mode, RHYTHM flags the over-loaded resources, allowing the user to take corrective actions to meet the delivery date. However, the user also has the choice of using RHYTHM's constraint-based, load balancing algorithm to automatically create an optimal finite capacity constrained plan.

accurate real-time, due-date quoting capability

RHYTHM's memory-resident planning engine is extremely fast. A plan can be generated in minutes compared to hours in traditional systems. Factory Planner supports a highly flexible modeling environment that allows users to model their manufacturing operations at a detailed level. Factory Planner can be integrated with order management systems where customer service representatives can confidently quote accurate delivery dates in seconds or determine the status of a customer order in real-time, based on current production and inventory status.

tight integration with existing systems

Using RhythmLink™, i2 Technologies' integration tool, the Factory Planner can be integrated with ERP and transactional databases, such as shop floor reporting. Whether the enterprise has made an investment in a client-server ERP system or is using legacy systems, RhythmLink provides quick and effective integration. Further, through real-time interfaces to ERP systems such as SAP and Oracle, Factory Planner uses the data maintained on these transaction systems to provide advanced planning capabilities.

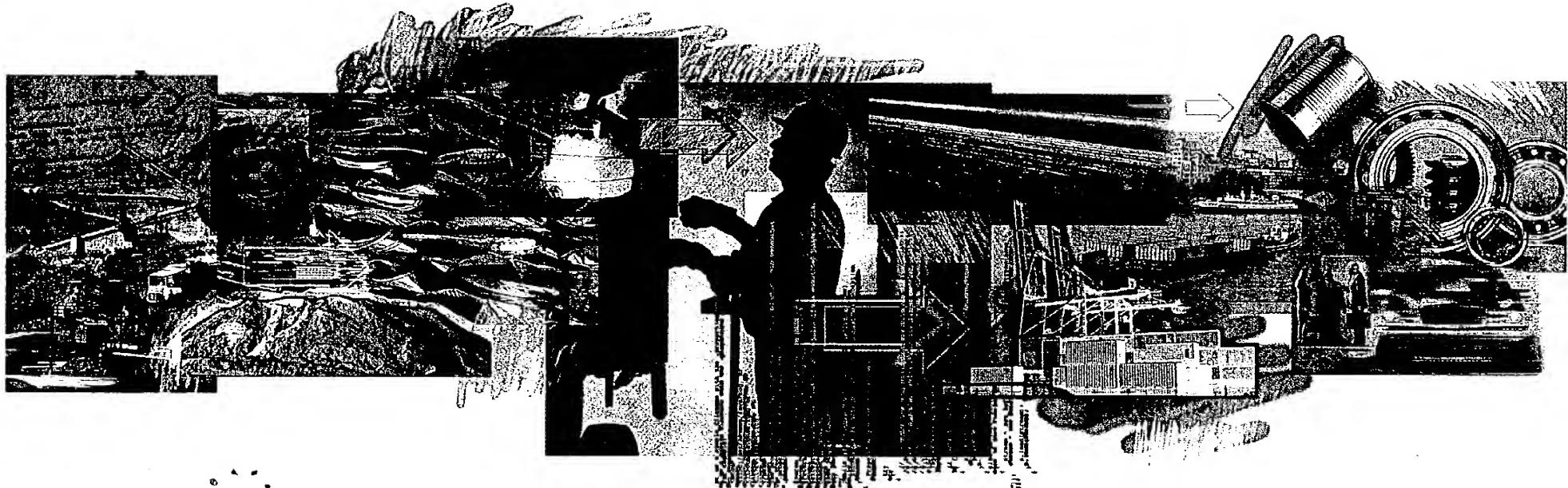


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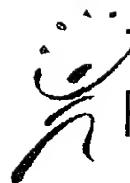
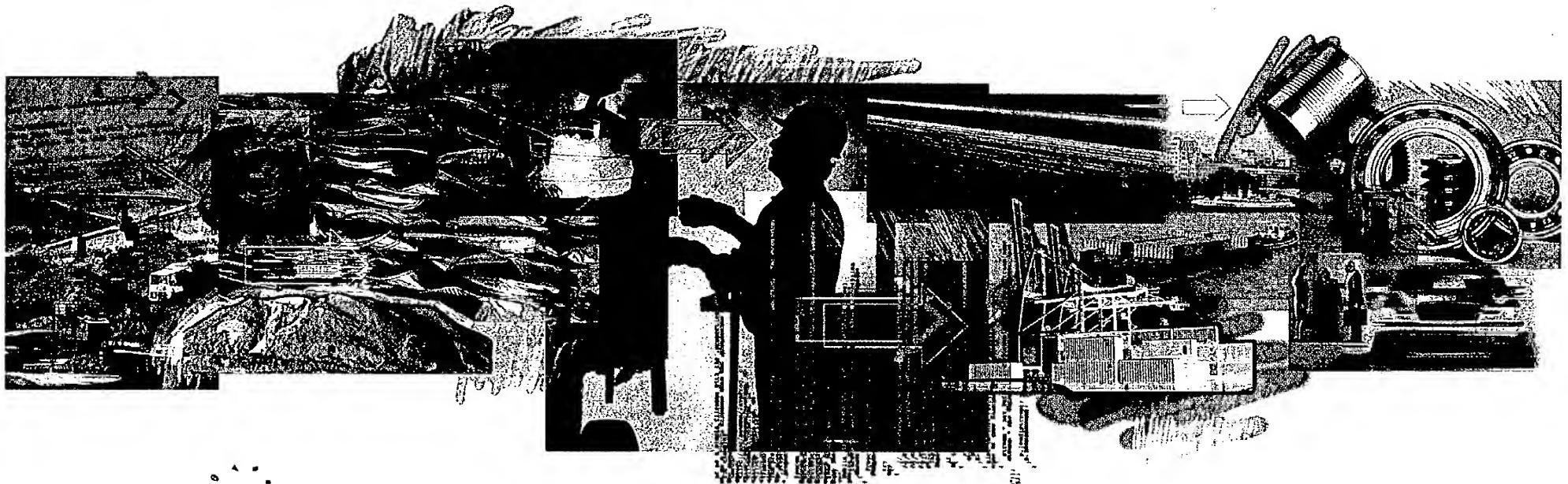


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dynamic cycle optimizer



RHYTHM® Dynamic Cycle Optimizer™ (DCO™) is one of the modules of the RHYTHM tightly integrated solution for Metals. As an extension to RHYTHM Factory Planner, DCO manages the campaigns, cycles and groups that must be considered when generating an accurate metals production plan.

why is DCO needed?

At each stage in the process in a metals plant, there are grouping criteria that are used to make production more efficient. These groups, also known as campaigns and cycles, differ depending on the part of the process being examined. For example, at steelmaking, it is necessary to group compatible grades together and to sequence heats in the casters based on grade compatibility. Usually, the changeover from one group to another requires a major setup to be performed. For this reason, when a setup is completed, the production facility is expected to run for a minimum period of time before another major setup takes place. Due to equipment limitations, there may also be a maximum group size that can be produced during one setup. The process of generating these groups has a direct impact on the lead-time, work-in-process levels and late orders, or, in other words, the “quality” of the plan.

what does DCO do?

The Dynamic Cycle Optimizer adds a sophisticated optimization algorithm, specifically developed to address the Metals industry, to the RHYTHM Metals Factory Planner. DCO simultaneously considers all of the specified grouping and sequencing criteria and generates cycles dynamically in such a way that the resulting production plan minimizes lead times, work-in-process inventories and late orders. Most importantly, the cycles are determined by the pre-defined criteria and the algorithm, not as an input or constraints to the planning process. DCO, with the RHYTHM Metals Factory Planner can be used in conjunction with the Mill Scheduler suite of products to determine the optimal sequence of operations at each resource.

dynamic cycle optimizer

continued

how does DCO complement RHYTHM Factory Planner™?

DCO complements the existing functionality of RHYTHM Factory Planner in three ways:

- It generates optimized cycles automatically by considering all of the grouping and cycle criteria simultaneously.
- It eliminates the need to consider several alternatives, one-at-a-time, to come up with a final, optimal plan.
- It reduces the planning cycle time dramatically and automates a difficult manual process.



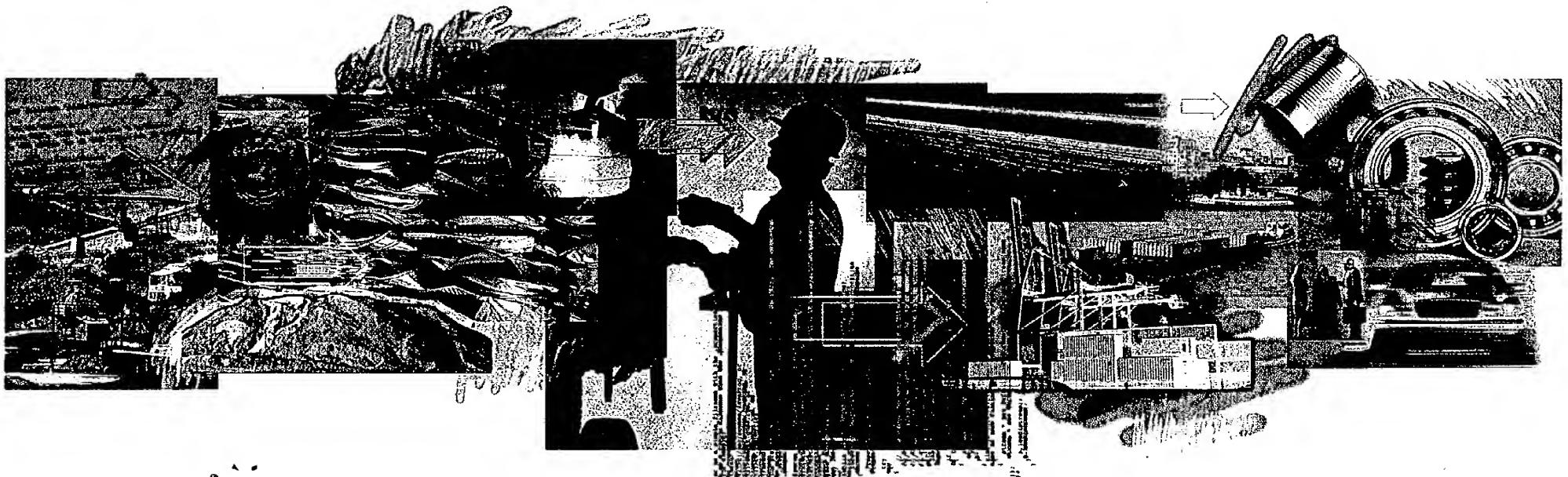
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demand planner



RHYTHM® Demand Planner™ is one of the modules of the RHYTHM tightly integrated solution for the metals industry. Understanding demand and managing factors that impact demand have become increasingly critical to the success of metals companies. RHYTHM Demand Planner factors in seasonal fluctuations, economic conditions, promotions, pricing, competitors' activities and the actions of key customers to create a model that assists in generating better forecasts as well as providing the capability to analyze and evaluate forecast performance.

fundamental planning principles

Usually, various departments within a metals company such as manufacturing, transportation, sales, marketing and finance create their own frequently conflicting forecasts. Such approaches are standard since commonly used demand planning tools do not support the ability to generate, store and evaluate multiple plans, incorporate input from any number of internal or external sources, consider causal factors nor effectively manage consolidation of conflicting plans. RHYTHM Demand Planner fully supports internal and external collaboration, aligning all of the various plans into a consensus plan.

RHYTHM Demand Planner solves complex problems

RHYTHM Demand Planner is a complete forecast and demand decision support tool. Demand Planner provides a modeling environment that combines the best statistical techniques, unlimited causal factors and the ability to manage multiple inputs with multi-dimensional data representation and analysis in a user-friendly environment. Using RHYTHM Demand Planner, planners can accurately model their business in real-time—helping companies to be more responsive, and helping organizations to greatly reduce forecast error, increase planning accuracy and link the planning process directly to strategic goals.

demand planner

continued

multi-dimensional representation of demand

RHYTHM Demand Planner is unique in its ability to manage demand in multiple dimensions. Dimensions are the different levels or definitions through which the user can interact with the data. These dimensions might be geography, products, plants, distribution centers, accounts or customers. Through this capability, users of RHYTHM Demand Planner manipulate demand plans in the context of their part of a business process. Additionally, you can define time in a hierarchy of increments such as weeks, months and quarters.

top down, bottom up or middle out

Forecasts derived or adjusted at a national level may be allocated down, for example, to a territory level. Forecasts derived at a product level can be added up so the effect is reflected at all higher levels. If you derive a forecast at the district level, any changes made can be allocated down to territories and summarized up to the national level.

internet focused

RHYTHM Demand Planner provides full access to demand planning information across intranets and the Internet. There is no requirement to build custom web pages or user interfaces. A standard web browser can invoke the underlying business objects.

unique features of RHYTHM Demand Planner

- **superior allocation capabilities**—Any technique used to forecast can be also used to allocate. Or, a technique may be used exclusively for allocation. For example, a simple moving average may be a poor forecasting technique, but works great for allocation.
- **flexible forecasting techniques**—Delivered with 35 forecasting techniques including the ability to automatically Pick Best.
- **bookmarks**—Save work sessions with bookmarks; return to your work, open the bookmark and continue where you left off.
- **unlimited capability to utilize causal factors**—Incorporate an unlimited number of causal factors, such as promotional events, into your forecasting models.
- **new product introduction**—Derive forecasts for new items by simultaneously considering attributes from multiple existing items.

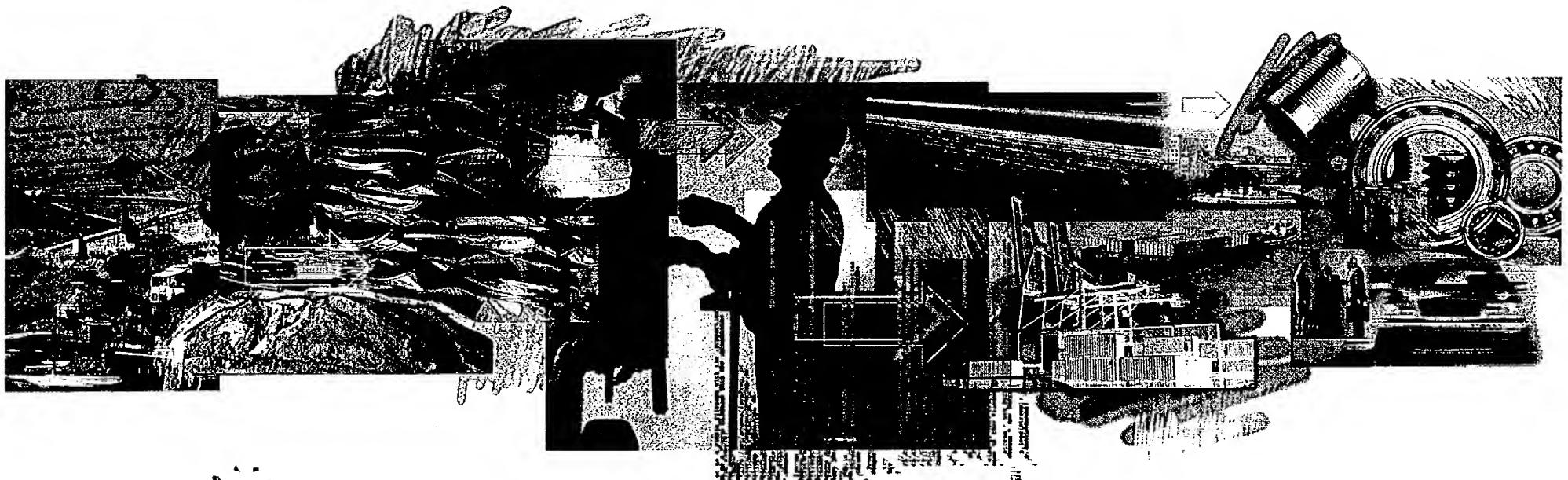


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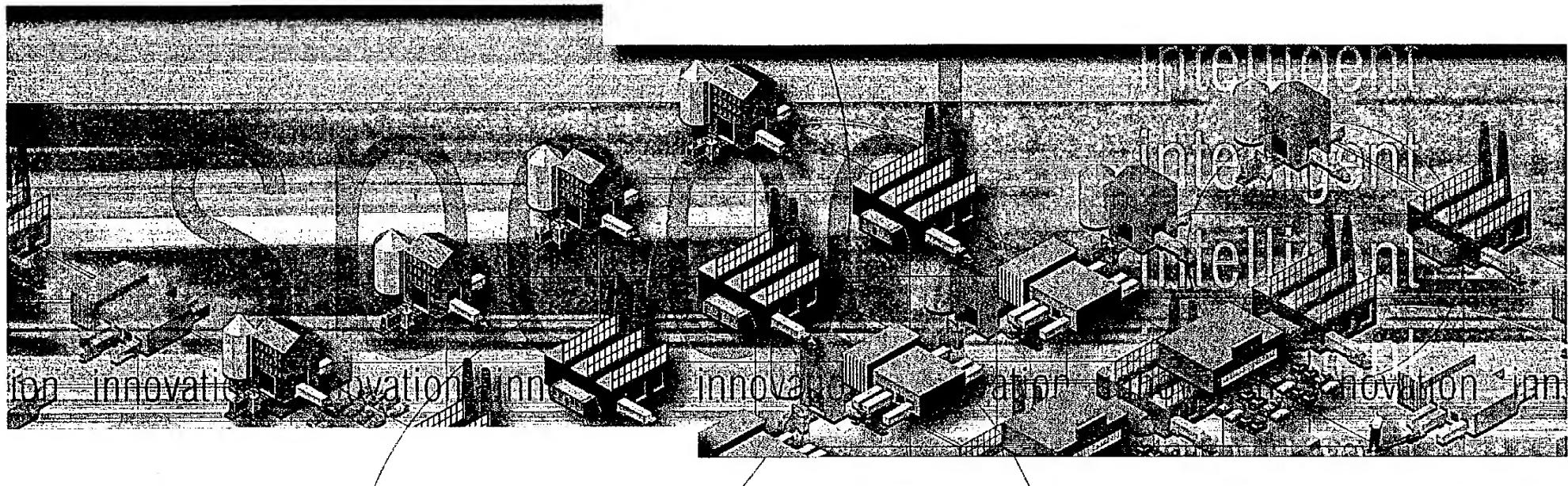
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I2 eBusiness

intelligent solutions for multi-enterprise buying & selling



what is eBusiness?

Simply put, eBusiness is the automation of buyer and seller relationships, using the World Wide Web. eBusiness means connecting all types of buyers and sellers in a global enterprise. It means consumers are connected to retailers, retailers are connected to manufacturers, and manufacturers are connected to suppliers.

The primary benefit of eBusiness is that people can buy and sell products and services more quickly and conveniently, in an environment that is personalized and dynamic.

why is i2 eBusiness unique?

It is *intelligent* eBusiness.

In today's competitive market, it is simply not good enough to make buying and selling decisions more quickly. It is more important to make the **right** decisions more quickly.

i2 eBusiness solutions help you make the **right** decisions, because they are:

- integrated with the supply chain.

Built upon i2's industry-proven supply chain planning engine, which optimizes the buying and selling process. Allows buyers and sellers to make intelligent decisions, based upon availability, capacity, and overall cost.

- multi-enterprise

Provides an end-to-end solution for all types of consumers and suppliers. Enables intelligent decision-making with comparison shopping, real-time forecasting, and partner collaboration.

- velocity-enabled.

Provides velocity in producing and moving goods, and exchanging information. Allows buyers and sellers to make the right decisions more quickly.

what are the components of the j2 eBusiness solution?

The i2 eBusiness solution consists of industry-proven i2 software, integrated with i2 eBusiness alliance partners. Together, this combination provides you with a multi-enterprise community for integrating all buying and selling relationships. It is a complete “Customer to Supplier” solution.

i2 eBusiness

intelligent solutions for multi-enterprise buying & selling

i2 eBusiness products

The i2 Global Series products are the foundation for i2 eBusiness. This family of products provides functionality for both buyers and sellers in business-to-business and business-to-consumer relationships. Using the i2 solutions, corporations can recognize the following benefits:

- **reduced operating costs**—*Buyers can accurately predict when suppliers will provide raw materials, goods or services. Buyers can negotiate best price and delivery for these items*
- **improved customer service**—*Sellers can provide real-time product availability and configuration details to their customers, thanks to the advanced optimization capabilities of the back-end planning engine.*
- **improved communications**—*All participants in the buying and selling chain can collaborate, provide accurate forecasts, and modify buying/selling decisions based upon real-time product information.*
- **increased revenue opportunities**—*Companies can react to market demands, enter new markets quickly, and achieve competitive advantage.*

the i2 eBusiness solutions provide value to buyers and sellers as follows:

i2 Solution	Buyers/Sellers	Value
Global Procurement Manager	Buyers	Provides collaborative material planning between manufacturers and suppliers.
Global Fulfillment Manager Customer Commitment	Sellers	Provides quoting and ordering for customers, while brokering product availability with multiple suppliers. "Configure-to-Availability"™ solution.
Global Demand Manager	Buyers and Sellers	Provides collaborative forecasting and demand management between manufacturers, suppliers and customers.
Global Logistics Manager	Buyers and Sellers	Enables monitoring and tracking of product flow through supply chain, for customers, suppliers, manufacturers.
Global Collaboration Manager	Buyers and Sellers	Underlying architecture, framework and workflow for collaboration between buyers and sellers.

i2 eBusiness alliances

The i2 eBusiness alliance partners provide complimentary solutions for the i2 eBusiness products. Our eBusiness alliances are focused on joint business development and product integration with i2. Together, this combination supports both business-to-business and business-to-consumer relationships. Initial alliance partners will include software solutions, such as storefront, product catalog, corporate procurement, and MRO supply ordering. Subsequent alliance partners will include "platform" solutions, such as high-availability hardware and network service providers.


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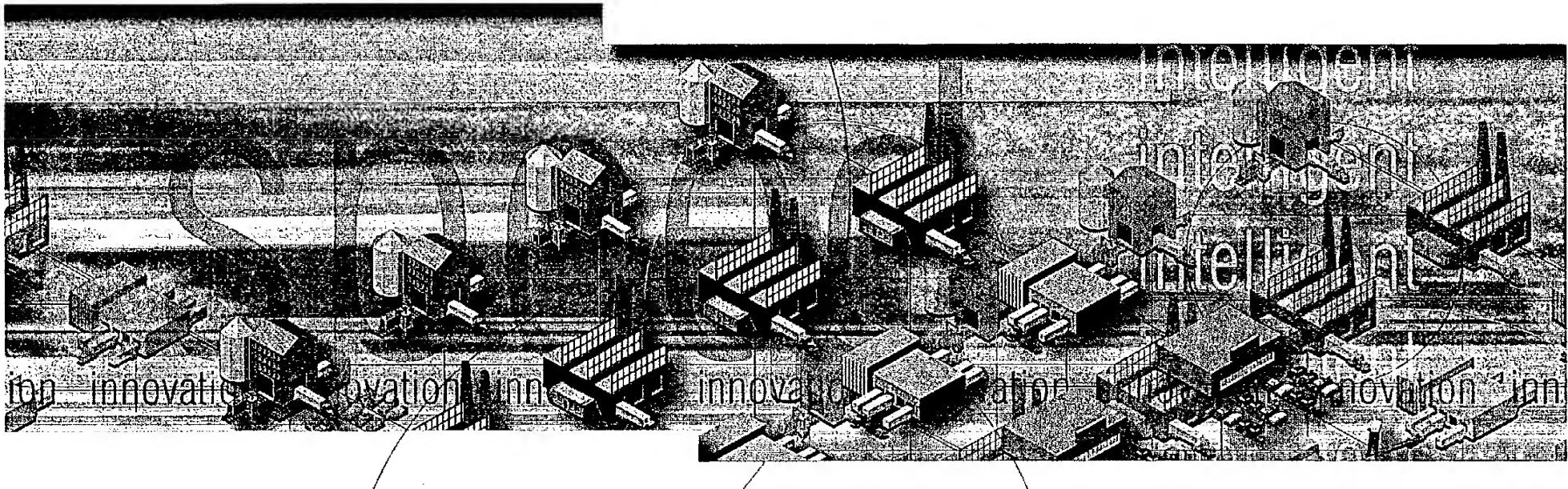
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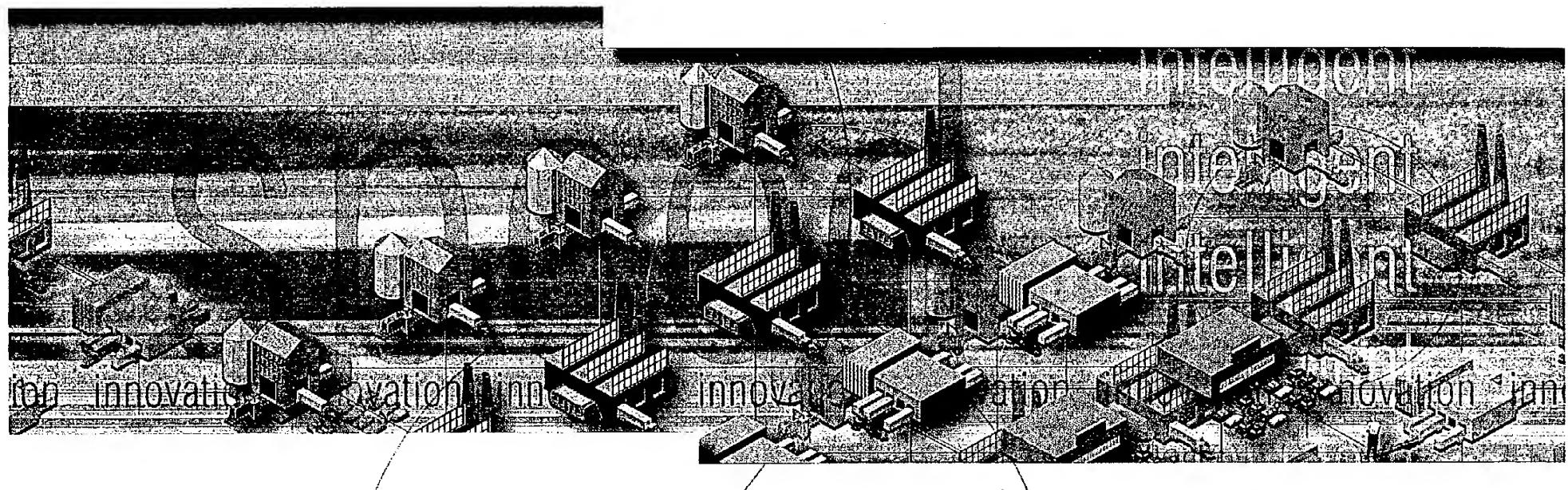
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sales

intelligent decision support



RHYTHM Sales is an integrated advanced planning and optimization solution for the Sales and Marketing process. It provides a real-time integration of the direct customer contact (product configuration and pricing, Internet access) with enterprise-wide demand and supply chain planning, enabling delivery date promises based upon the constraints and material availability in the supply chain.

RHYTHM Sales positively impacts a company's bottom line by:

- *increasing the sales volume through unprecedeted speed and flexibility to meet customer's demand*
- *increasing the productivity of the sales and marketing organizations through improved collaboration capabilities, more efficient customer contact (e.g. by Internet) and transparency*
- *optimizing the resources and assets of the enterprise across the supply chain*

The global trend in business towards mass customization and one-to-one marketing brings new challenges, especially to Sales and Marketing. Whereas in the past the customer was satisfied with "standard" products, today's customer demands highly customized products right now. This new customer paradigm requires significantly more responsiveness and flexibility in the Sales and Marketing functions within the enterprise. As a result, these new, state-of-the-art Sales and Marketing functions need advanced software solutions to answer a number of critical questions in real time, including:

- *What is the best marketing mix (price, product, promotion, distribution strategy) for my organization?*
- *What is existing demand for products and how do I generate additional demand?*
- *How can I make a specific product offering that best meets the needs of my customer?*
- *What are the best products for me to push through my sales pipeline?*
- *Which marketing campaigns should I take on to drive the most revenues?*

sales

intelligent decision support

Traditionally, the sales and marketing core tasks have been considered as more or less separate. However, in a fast-paced market, this fragmented approach often leaves important business opportunities untapped and is not flexible enough. A more holistic and integrated approach can only be achieved with better "knowledge" of the markets, products, channels and customer demands, combined with real-time decision support capabilities.

For customers with configurable products, RHYTHM Sales is the cornerstone of an integrated e-business solution, as it provides both the internet-enabled customer interface, as well as the back-end integration into the extended supply chain with real-time delivery promises.

the RHYTHM advantage

RHYTHM Sales is fully integrated as one of the core processes covered by RHYTHM. It combines and leverages proven RHYTHM solutions and closes the loop from supply and demand, giving unmatched capabilities to planners and the sales and marketing organization.

leading-edge technology

As a part of the RHYTHM Global Decision Support Architecture (GDSA), RHYTHM Sales shares data between planning domains from all the planning tools in the enterprise. It can also be quickly and easily integrated with data from Enterprise Resource Management systems like SAP, Oracle Manufacturing, J.D. Edwards and SSA. The integration is accomplished through industry-standard technologies including Java, DCOM and CORBA.


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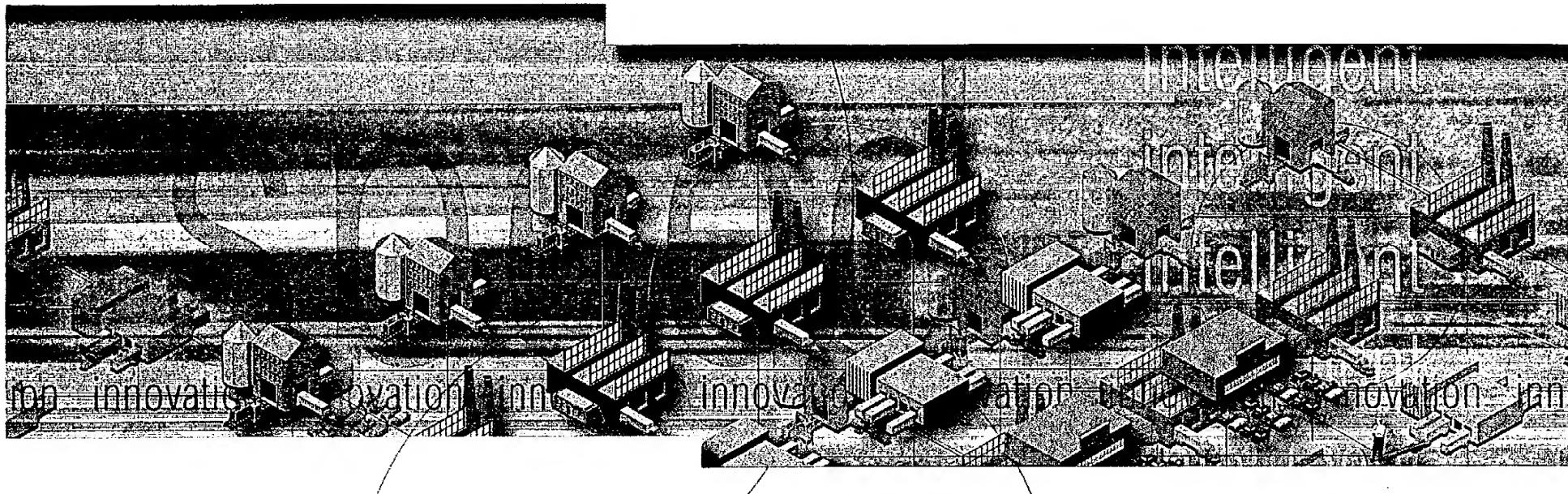
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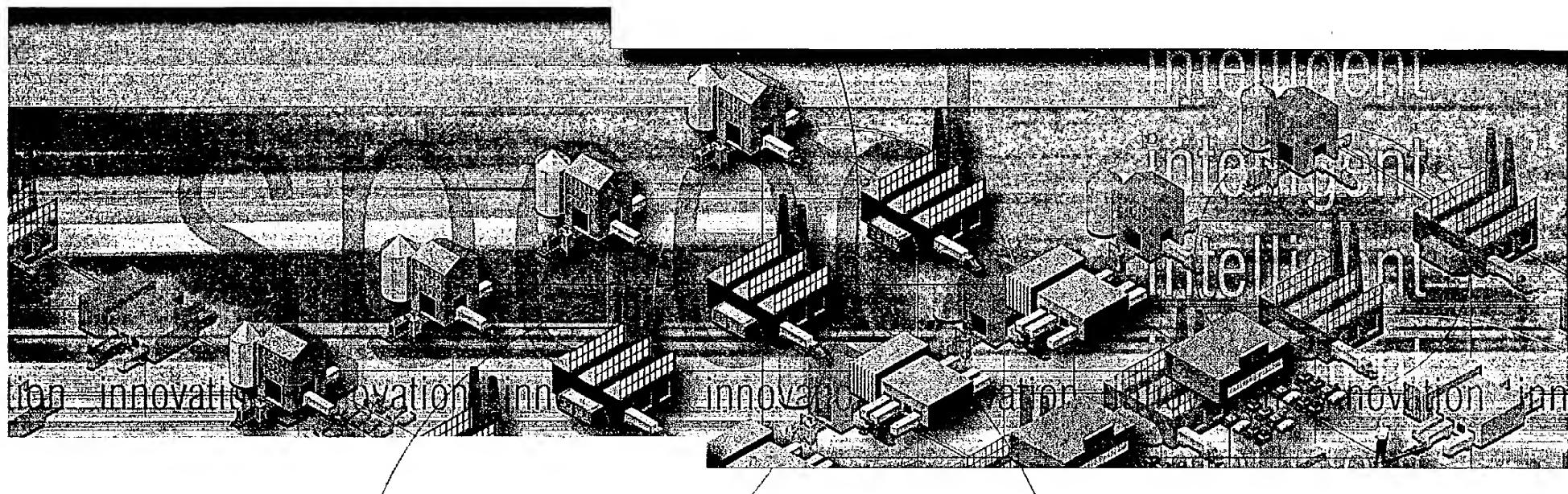
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product development

intelligent decision support



RHYTHM Product Development™ is an integrated suite of software solutions designed to provide intelligent decision support throughout the total life cycle of the product. RHYTHM Product Development incorporates advanced optimization, planning, and collaborative technologies and integrates with existing enterprise-wide decision support and resource planning tools.

today's product development—tougher choices and decisions

Companies invest large amounts of money in product development to introduce products that will define the future of their organizations. New products drive corporate revenues, market shares and even stock prices. In today's business environment, product innovation has become a challenging task, as both the speed and complexity of product development have increased. Rapid technological advances, changing consumer needs, shorter product life cycles, and increasing competition are a few reasons for increase in velocity. Increased complexity is compounded by information overload, global market requirements, and decentralized development.

Organizations are finding they need to make tougher decisions and make them quickly. Complex product development decisions require cross-functional integration of different resources and information.

key activities within product development

The product development function can be broken into eight interconnected activities.

- **initiate concept**—incorporate market and customer needs into a product concept
- **plan portfolio**—evaluate portfolio, incorporate financial & resource information
- **plan pipeline**—plan products in the pipeline, aggregate resource requirements
- **schedule and track**—assign schedules, track progress and develop contingencies
- **design product**—design the actual product, prototyping and testing
- **establish production**—evaluate capability and capacity to produce product
- **coordinate suppliers**—identify and work with suppliers for designing and producing
- **manage transition**—launch product while strategically phasing out old product

product development

intelligent decision support

RHYTHM Product Development—intelligent decision support

RHYTHM Product Development provides a comprehensive and integrated suite of tools to support managers who make tough decisions throughout the product development process. It is designed to make the decision-making process more efficient and effective.

RHYTHM Product Development is based on two basic principles—integration and technology.

- **integration**—RHYTHM Product Development integrates across product development and enterprise-wide activities. Integration also occurs across existing tools such as i2 RHYTHM tools, ERP systems, and standalone applications tools (like product data management, design automation, project management, etc.).
- **technology**—RHYTHM Product Development incorporates i2's recognized strengths in optimization and planning, and multi-enterprise collaboration software.

decision making using RHYTHM Product Development

- How do we shorten the time-to-market for critical projects?
- Which projects and resources should we invest in?
- How do we prioritize projects in an ever changing business environment?
- What is the impact of design and schedule changes on other projects and overall profitability?
- Which design option best leverages our supply chain capabilities?
- Which supplier should be selected based on their design lead-time and component cost?
- What is the impact of end-of-life decisions on inventory, capacity, and revenue?

These are a few of the typical questions that managers face as they manage the product's life cycle. RHYTHM Product Development suite is designed to provide managers with intelligent options through integrated visibility and optimization capabilities.

availability of RHYTHM Product Development solution

RHYTHM PD Planner™ is the first component of the RHYTHM Product Development suite. This product provides intelligent decision support for planning the product development portfolio and pipeline. For detailed information on this product, please review separate documents for RHYTHM PD Planner.



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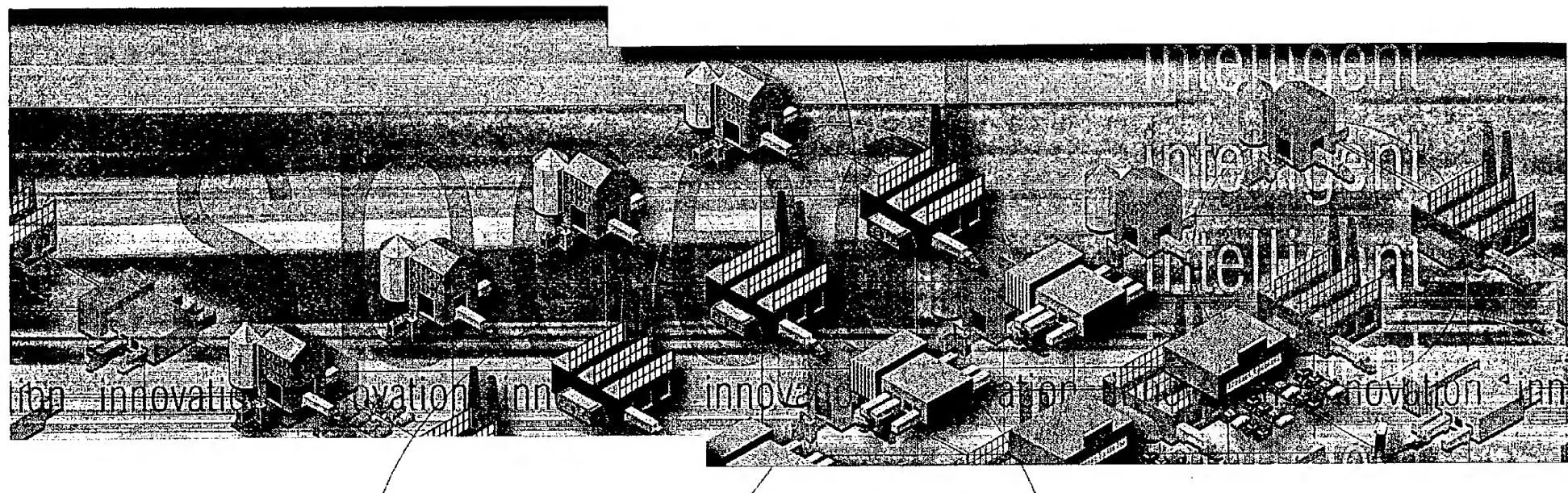
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product development

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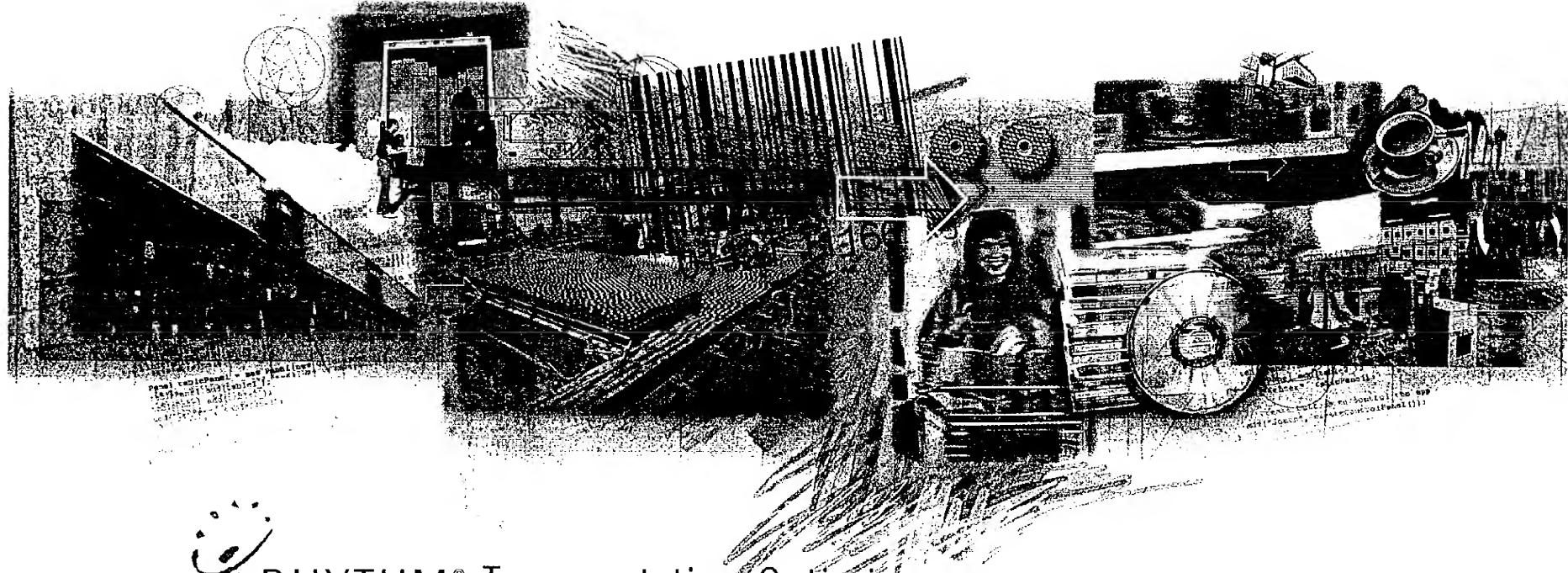
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transportation optimizer



RHYTHM® Transportation Optimizer provides a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated planning and scheduling architecture. It enables logistics managers within Consumer Packaged Goods (CPG) companies to automatically consolidate shipments, optimize delivery routes, calculate actual carrier and transfer costs and accommodate all service requirements. And all of these decisions are driven by a combination of real-world data and sophisticated solving techniques.

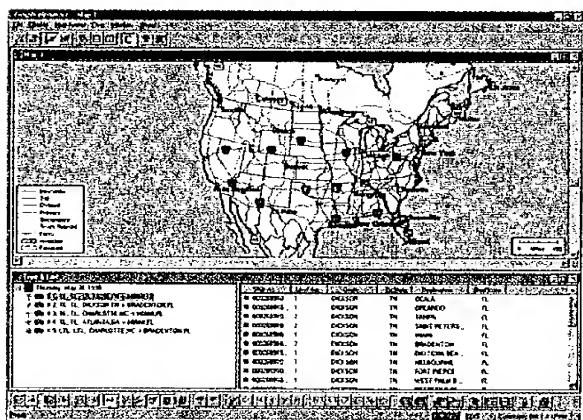
fundamental planning principles

CPG supply chains incorporate a multitude of transportation complexities: multiple levels of facilities, warehouse to cross-dock to carrier terminal to customer, multiple modes, motor carrier, rail or air, and even different service offerings within modes. On top of that, the planning horizon may be as short as a few minutes or long as many weeks. RHYTHM Transportation Optimizer deals effectively with all of these real-world transportation issues. It creates truly executable schedules—ones that will save you lots of money!

RHYTHM transportation optimizer solves complex problems

Transportation managers within CPG companies face many challenges in the process of trying to create cost effective, executable routing plans. Simultaneously achieving the lowest cost while providing the best service involves deriving plans that are capable of considering LTL versus full truck, the impact of consolidation and de-consolidation hubs, the use of multi-stop versus direct point-to-point loads and the configuration of multi-load stops. RHYTHM Transportation Optimizer provides managers with the flexibility and the decision support they need to create schedules that consider these kinds of real-world tradeoffs.

transportation optimizer



seamless integration with enterprise transportation management

RHYTHM Transportation Optimizer works seamlessly with RHYTHM Transportation Manager. As a shipment travels through the supply chain, track and trace functionality maintains an accurate and current record of its status and location. EDI transactions, automatic system updates and user interaction refresh this data throughout the entire life cycle of the shipment. This important information can be communicated electronically, via the Internet if desired, to the transaction's constituents.

unique features

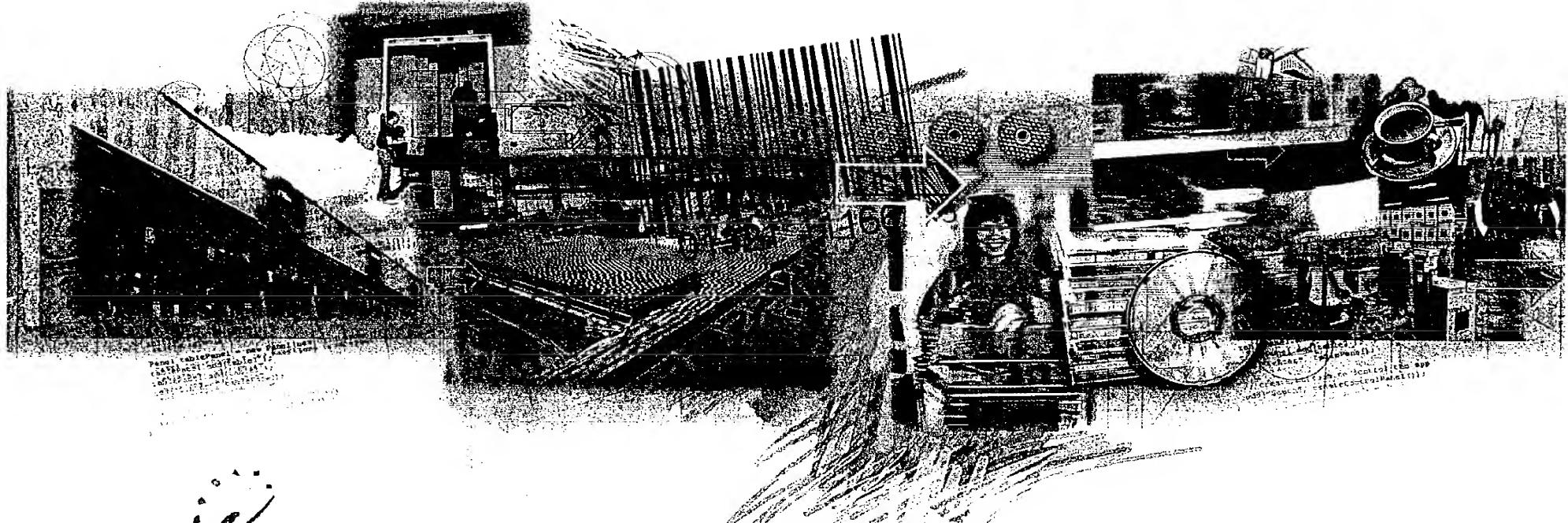
- **advanced mathematical optimization**— proven, advanced mathematics creates executable plans and schedules
- **uses real carrier and hub rates**—builds and routes loads while respecting all delivery, equipment and driver constraints
- **cost effective routing plans**—considers multiple pickup/multiple drop solutions
- **data and plans represented graphically**—view and manipulate all relevant data and plans graphically

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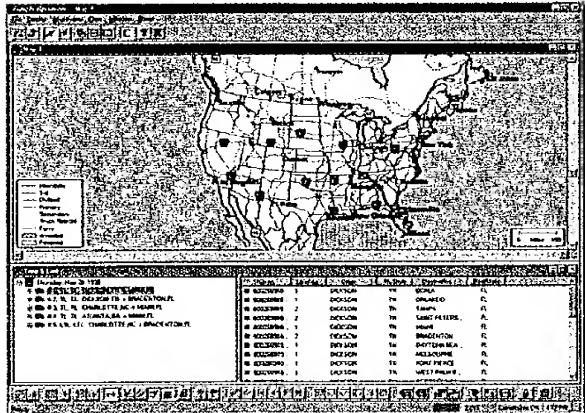
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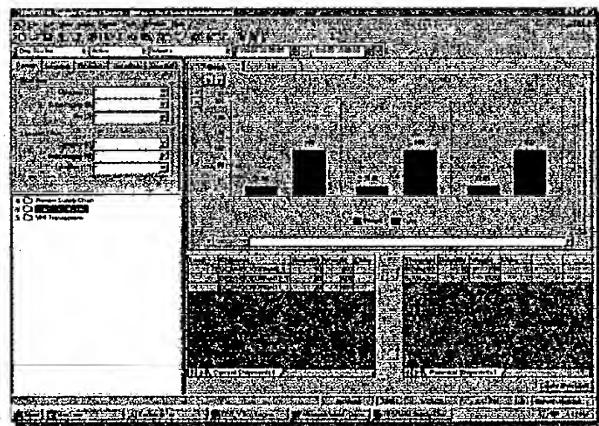
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shipment scheduler



resolve conflicting priorities

RHYTHM Shipment Scheduler respects a variety of conflicting priorities and objectives. Efficient loads must have the proper balance of volume and weight utilization. High priority items should be placed on the loads shipped earlier in the working day. Handling efficiency improves when loads contain fewer different items. Sometimes multiple transportation sources or destinations should be added to ensure a full-load shipment, but too many sources or destinations create additional complexity and cost. Frequently, to fill up a container, it makes sense to ship items before it's absolutely necessary—but pulling ahead too far or pulling ahead the wrong item can cause problems that ripple throughout the supply chain. RHYTHM Shipment Scheduler makes sense out of all this chaos and saves you money in the process!

unique features

- **advanced mathematical optimization**—proven, advanced mathematics factor both service and cost issues into transportation planning and scheduling
- **full, balanced loads**—minimize number of containers by creating full loads with the proper balance of weight and volume
- **prioritized loading**—ensure items required to meet demand are loaded before items needed to maintain inventory targets
- **handling efficiency**—improve efficiency by minimizing the number of items per load and by minimizing the number of source and destination points per load while still meeting service goals
- **multiple capacity constraints**—load restrictions specified by weight, pallet or volume

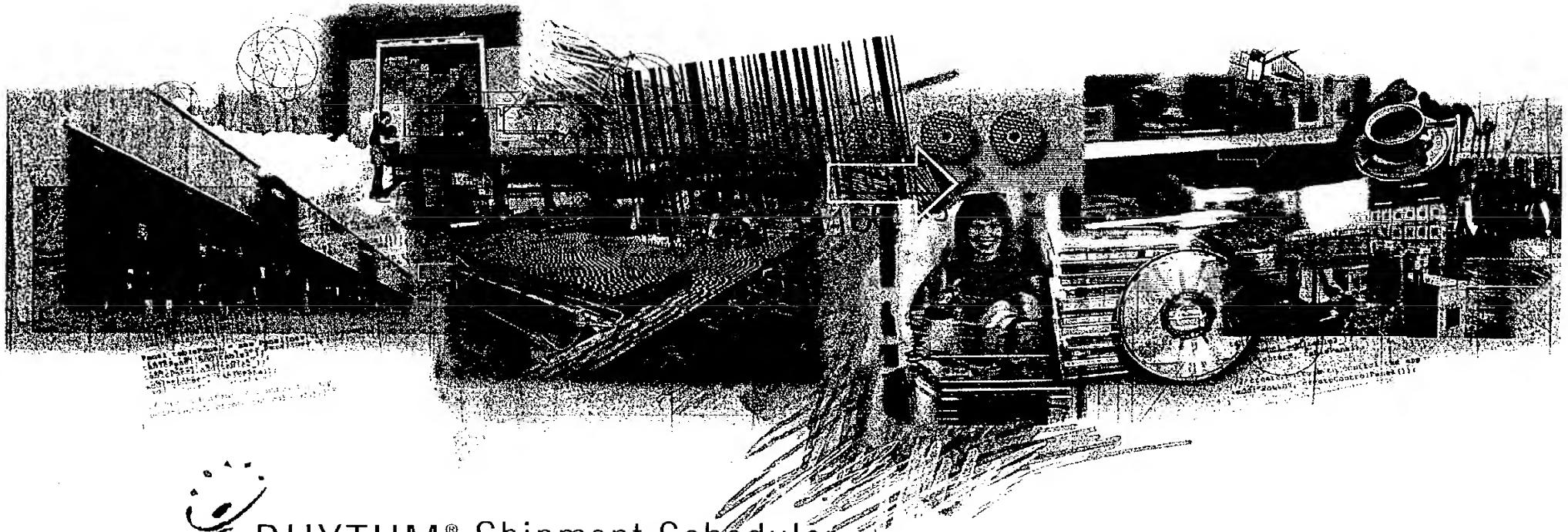
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shipment scheduler



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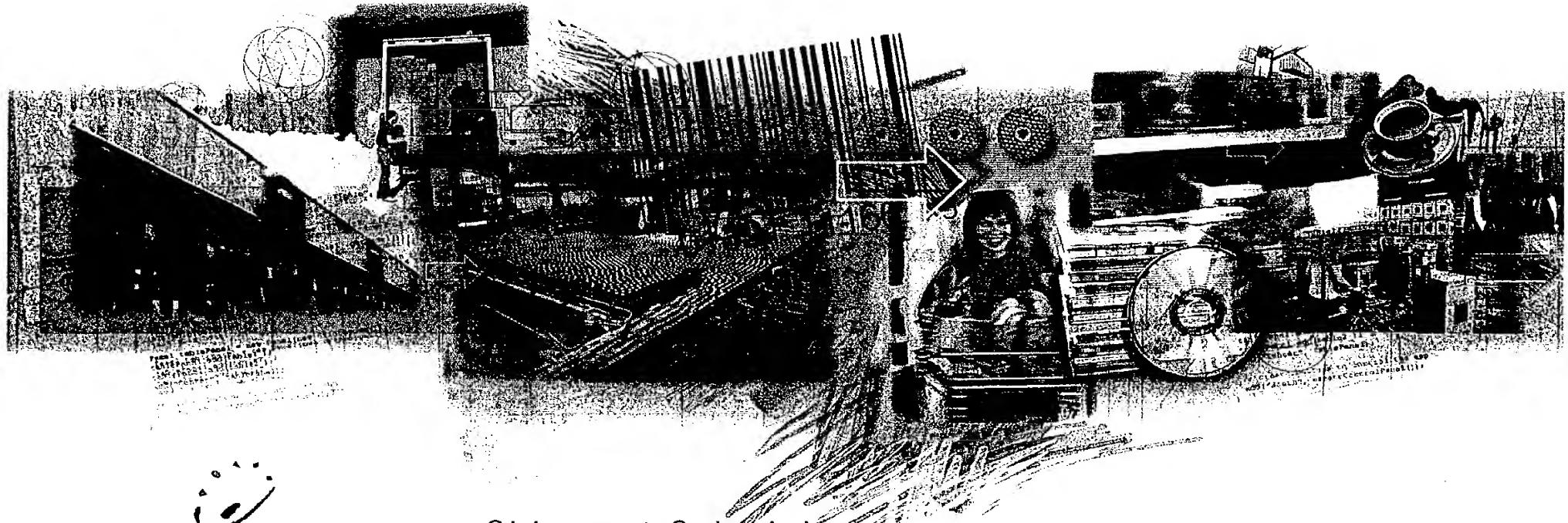
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Transportation optimization requires powerful mathematical solvers combined with real-world information about costs and constraints. RHYTHM Shipment Scheduler incorporates both of these important aspects. It can deal effectively with a multitude of real-world transportation possibilities including multiple levels of facilities, multiple transportation modes and differing service objectives within modes.

RHYTHM shipment scheduler solves complex problems

Transportation is perhaps the single most important supply chain constraint for CPG companies. Traditional planning approaches consider transportation constraints after distribution requirements planning has derived replenishment plans. That is, the prevailing wisdom argues that synchronization of distribution and transportation can be achieved by multiple iteration between distribution and transportation—but in practice, this is rarely feasible. RHYTHM simultaneously considers distribution, manufacturing, and transportation constraints such as transit times, truck capacity and alternate modes. Additionally, RHYTHM considers the availability of downstream resources like loading docks and it generates a globally feasible plan which includes shipment schedules.

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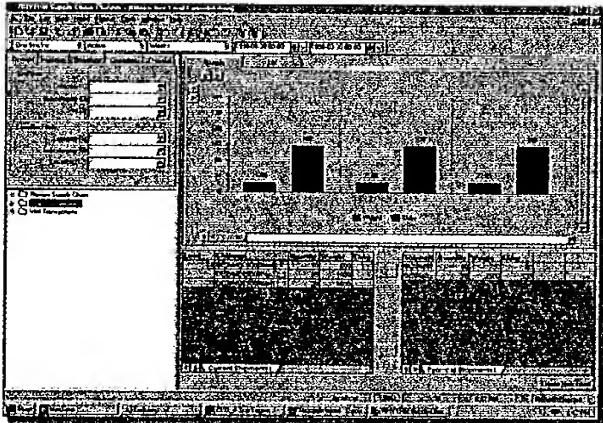
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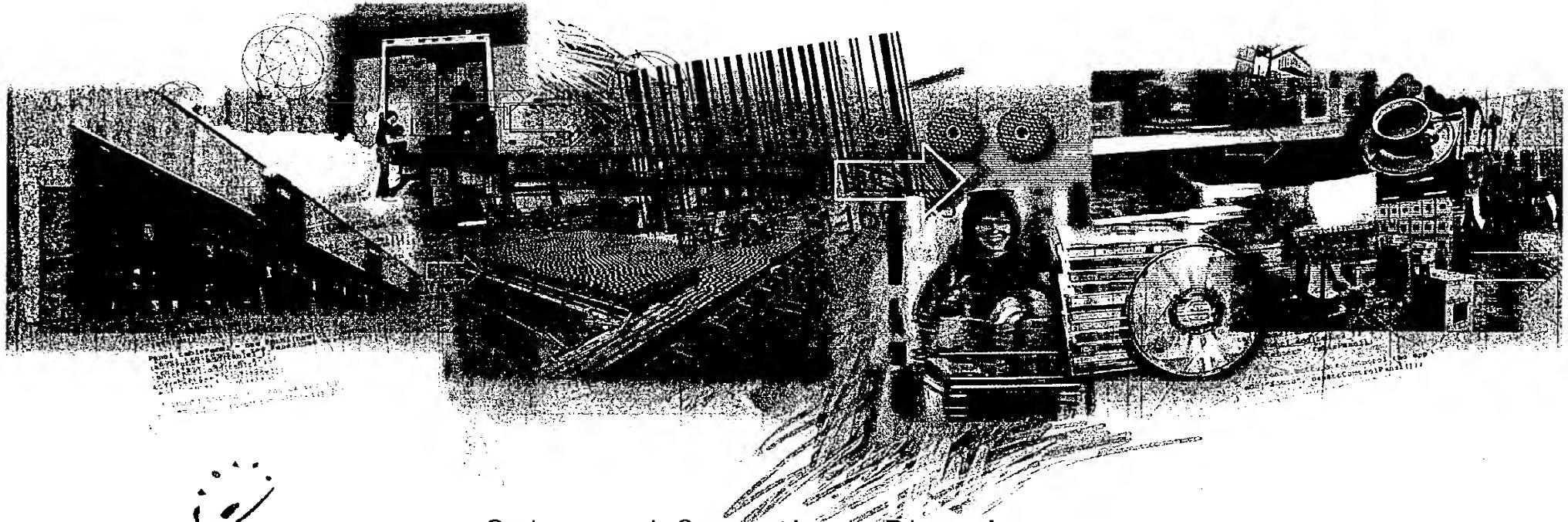
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sales and operations planning



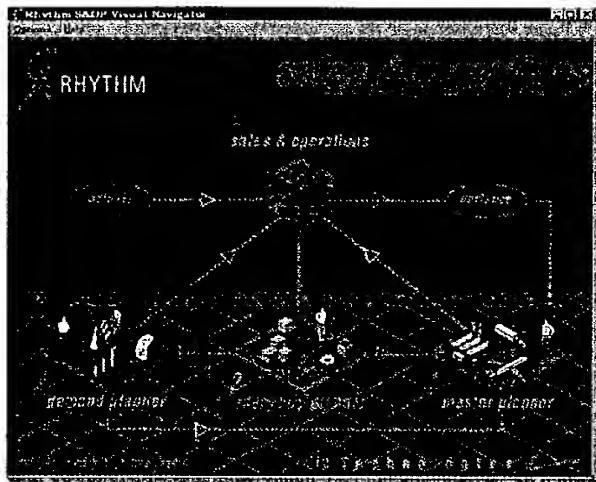
RHYTHM® Sales and Operations Planning *enables a business process that helps Consumer Packaged Goods (CPG) companies gain control over their direction and operations. It aligns planning across both the demand and supply domains by reconciling customer service goals, operational constraints, and financial objectives. S&OP enables CPG companies to align supply and demand forces including customers, sales, marketing, manufacturing, distribution, transportation and finance into an integrated plan that is consistent with the company's overall market share, profitability and customer service goals.*

fundamental planning principles

RHYTHM Sales and Operations Planning provides a clear and concise view of enterprise plans and allows management to focus on five critical questions.

- **where are you now?**—What is the current state of your business—including critical measures of company performance such as sales, customer service, inventory levels, production levels and variable costs?
- **is this where you planned to be?**—What was your plan? There were target levels for sales, customer service, inventory levels, production levels and variable costs. How does the current state of the enterprise compare to the original plan?
- **how did you get there?**—Actual performance and plans will almost certainly deviate. RHYTHM sales and operations planning provides a window into the causes and magnitude of the deviations.
- **where do you want to go?**—Compare where you are to where you want to be—does being there still make sense? If it doesn't, then how should you adjust your plans?

sales and operations planning



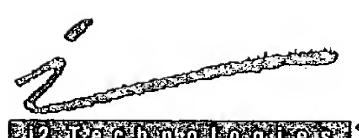
- **what is your plan to get there?**—Now that you've decided where you want to go, create a new plan—one based on real-time assessment of where you are versus where you wanted to be while understanding how you got there. This plan will include new sales and production plans along with the corresponding projected inventory targets and customer service levels.

RHYTHM sales and operations planning solves complex problems

Maximizing profits within large dynamic CPG companies requires managers to find the appropriate balance among financial goals, customer service levels and operational constraints. Needless to say, traditional planning approaches don't come close to providing managers with the analysis and "take-action" tools they need. RHYTHM supports the sales and operations planning process by providing a unique capability to create optimal plans.

an integrated view of the enterprise

Traditional planning approaches provide only limited capabilities to integrate plan related information captured across the enterprise. RHYTHM S&OP's underlying OnLine Analytical Processor (OLAP) allows extremely flexible integration of information and also provides the capability to create sophisticated analyses of operations. Using RHYTHM S&OP, you will have unprecedented visibility into your business' performance.

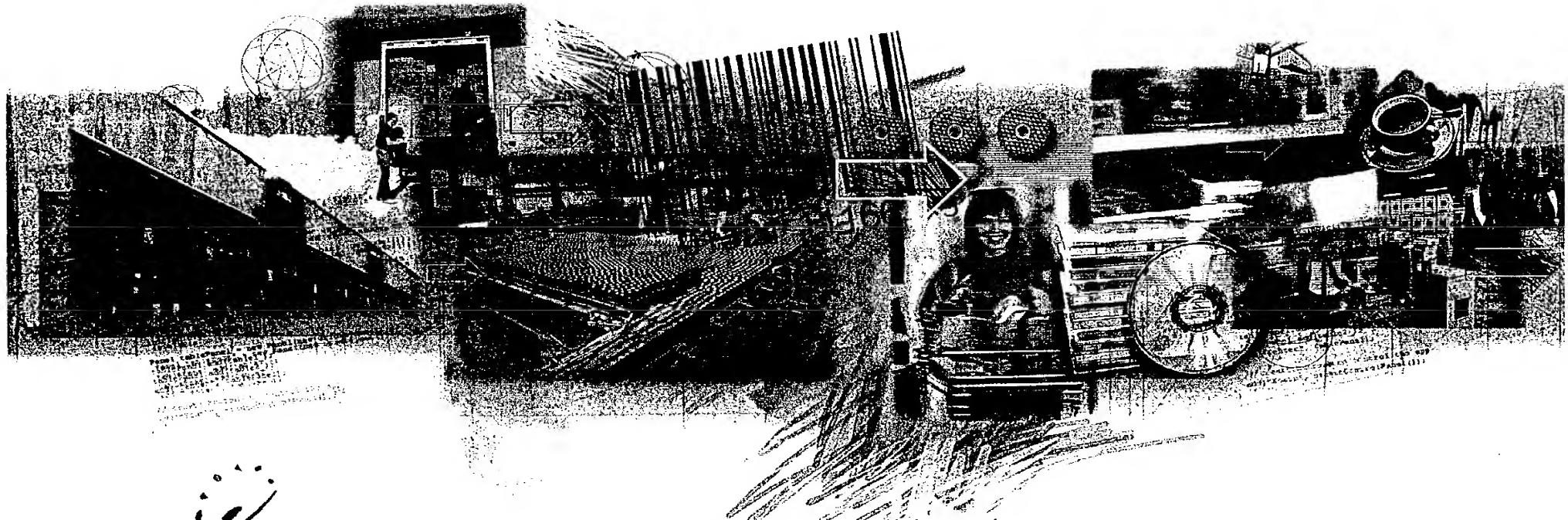

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sales and operations planning



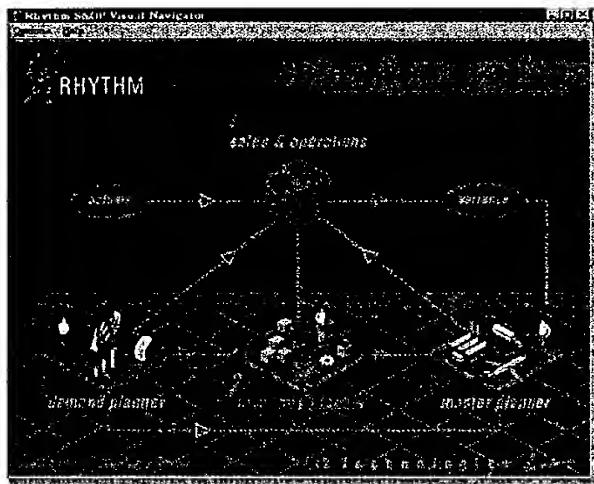
RHYTHM® Sales and Operations Planning enables a business process that helps Consumer Packaged Goods (CPG) companies gain control over their direction and operations. It aligns planning across both the demand and supply domains by reconciling customer service goals, operational constraints, and financial objectives. S&OP enables CPG companies to align supply and demand forces including customers, sales, marketing, manufacturing, distribution, transportation and finance into an integrated plan that is consistent with the company's overall market share, profitability and customer service goals.

fundamental planning principles

RHYTHM Sales and Operations Planning provides a clear and concise view of enterprise plans and allows management to focus on five critical questions.

- **where are you now?**—What is the current state of your business—including critical measures of company performance such as sales, customer service, inventory levels, production levels and variable costs?
- **is this where you planned to be?**—What was your plan? There were target levels for sales, customer service, inventory levels, production levels and variable costs. How does the current state of the enterprise compare to the original plan?
- **how did you get there?**—Actual performance and plans will almost certainly deviate. RHYTHM sales and operations planning provides a window into the causes and magnitude of the deviations.
- **where do you want to go?**—Compare where you are to where you want to be—does being there still make sense? If it doesn't, then how should you adjust your plans?

sales and operations planning



• **what is your plan to get there?**—Now that you've decided where you want to go, create a new plan—one based on real-time assessment of where you are versus where you wanted to be while understanding how you got there. This plan will include new sales and production plans along with the corresponding projected inventory targets and customer service levels.

RHYTHM sales and operations planning solves complex problems

Maximizing profits within large dynamic CPG companies requires managers to find the appropriate balance among financial goals, customer service levels and operational constraints. Needless to say, traditional planning approaches don't come close to providing managers with the analysis and "take-action" tools they need. RHYTHM supports the sales and operations planning process by providing a unique capability to create optimal plans.

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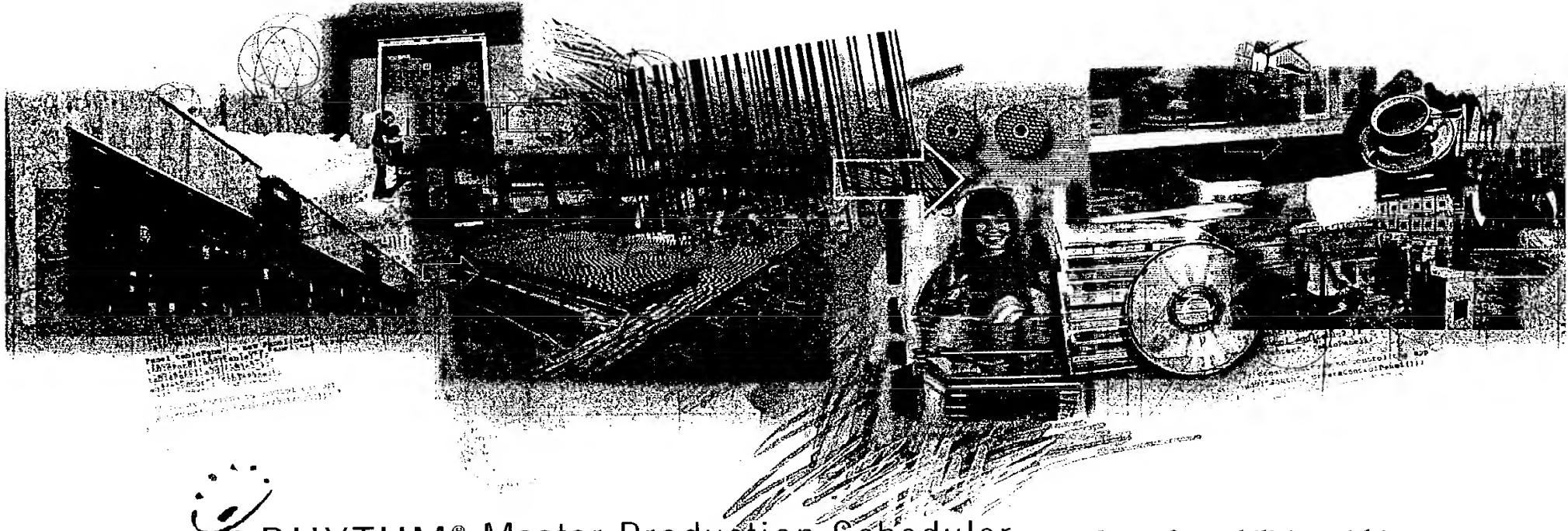


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master production scheduler



RHYTHM® Master Production Scheduler is a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated planning architecture. It enables managers to determine how much, when and on which production line to produce products that satisfy customer demands and maintain planned inventory levels. RHYTHM Master Production Scheduler's technology and architecture extends the current set of MPS capabilities to address new and emerging challenges for Consumer Packaged Goods (CPG) supply chains.

fundamental planning principles

RHYTHM Master Production Scheduler enables multi-plant master scheduling. It combines advanced, state-of-the-art mathematical methods with the best practice concepts. It provides a unique capability to create least-cost schedules related to limited production capacity. These schedules demonstrate methods to achieve tangible bottom-line benefits such as improved operating efficiency, reduced inventory levels and lower operating costs.

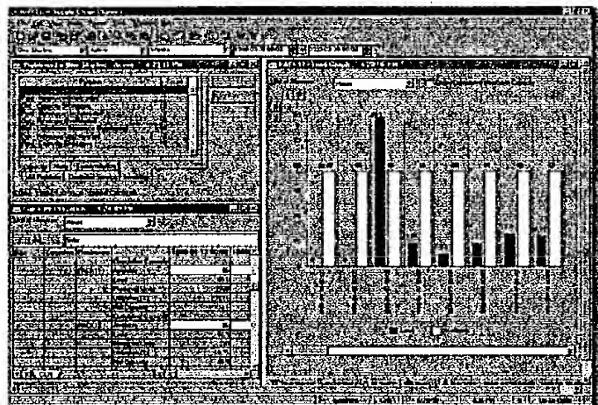
RHYTHM master production scheduling solves complex problems

Effective master production scheduling matches production capacity with requirements for finished goods. It also makes trade-offs between costs and capacities to achieve full equipment utilization at least total cost. Better schedules mean fewer and/or simpler production change-overs, resulting in greater production capacity.

differentiates between production for demand vs. for inventory

RHYTHM Master Production Scheduler proposes master schedules that stay within production capacity constraints while prioritizing production for customer demand over production for inventory.

master production scheduler



simultaneously considers multiple criteria

RHYTHM Master Production Scheduler minimizes direct production and setup costs while balancing inventory-holding costs. It respects production equipment cost differentials so it can suggest, under conditions of capacity shortages, the best strategy—produce preferred equipment or it can suggest routes to produce on time using non-preferred equipment.

trade-off set-up costs with lot size

RHYTHM Master Production Scheduler makes the best quantity of each product, given setup costs and competition for production capacity in each scheduling period.

immediate visibility of problems throughout the supply chain

RHYTHM Master Production Scheduler allows your planners to make and understand the consequences of complex, customer-specific decisions because it plans at a more detailed level.

unique features of RHYTHM Master Production Scheduler

- **advanced mathematical optimization**—proven, advanced mathematics ensures objectives are optimized to match business requirements
- **dynamic production run quantities**—production run lengths can vary from run to run depending upon production efficiency, production capacity, set-up costs and requirements for finished goods
- **flexible planning horizons**—plan in days, weeks, months quarters, years, or any combination
- **shared set-up time and cost**—products with common packaging or ingredients that share set-ups are produced together
- **multiple levels of overtime capacity**—straight time and up to three levels of overtime capacity at increasing costs
- **assign production to specific lines**—both the production cost and production rate can vary by individual product on each line

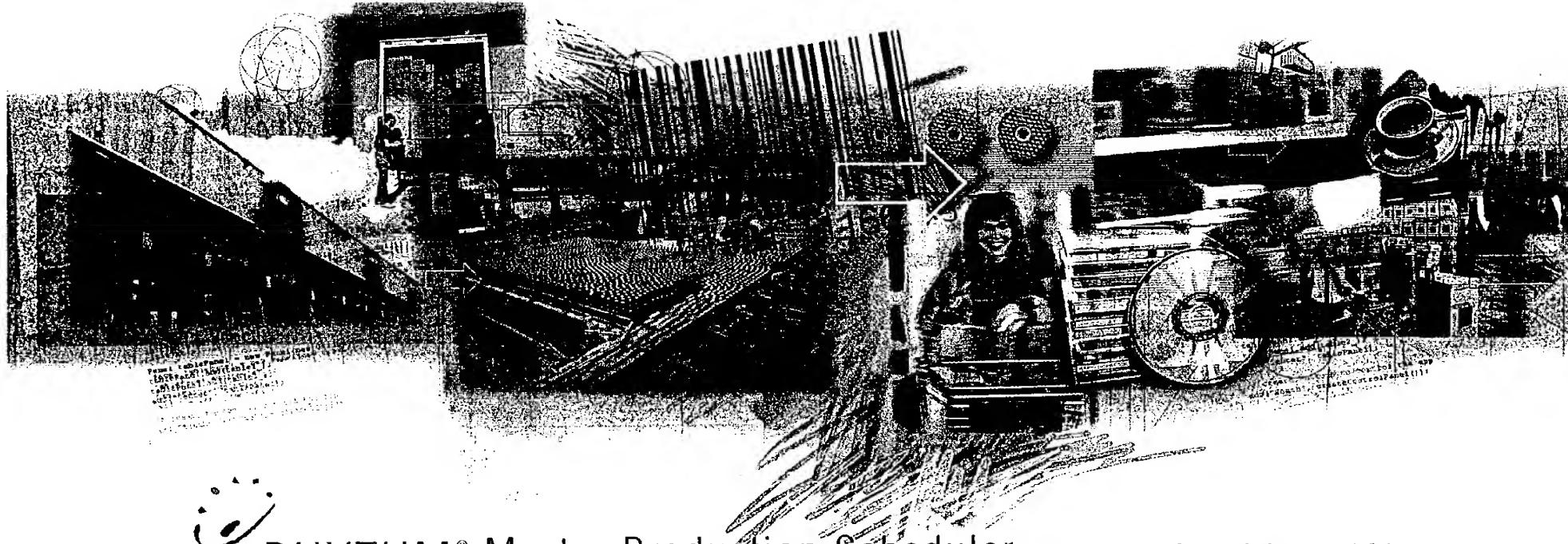
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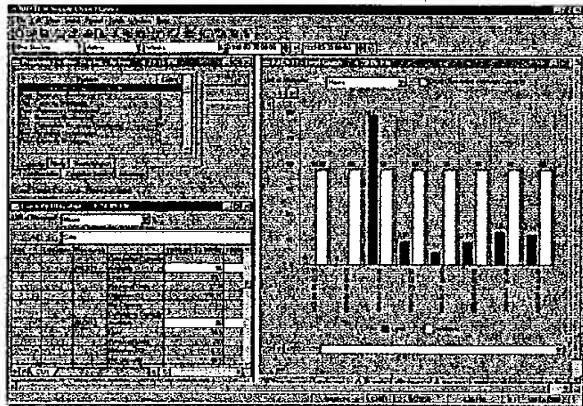
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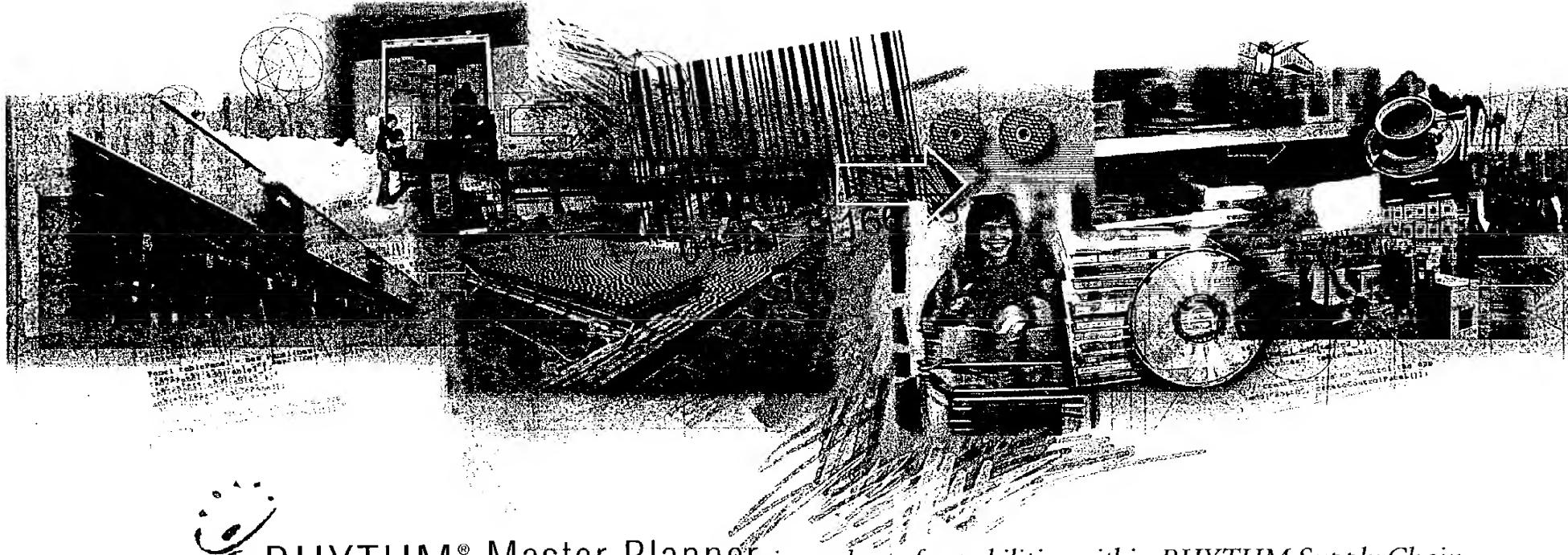
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master planner

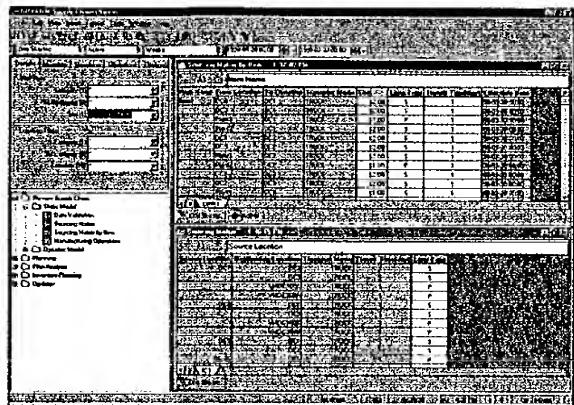


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fundamental planning principles

RHYTHM Master Planner is unique because it models the entire supply chain—with the flow of all major activities, and related constraints, represented within a single model. By modeling the entire supply chain at a macro or aggregate level, planners can understand how the total supply chain operates and see how its functional components interact under different conditions. RHYTHM Master Planner's ability to view all activities concurrently enables planners to synchronize the entire supply chain at an enterprise level, which helps them create a plan that meets the global business objectives.

master planner



RHYTHM master planner solves complex problems

The primary function of RHYTHM Master Planner is to balance unconstrained demand against the supply chain's constraints to maximize business objectives. To accomplish this, planners need to make intelligent decisions about the supply chain.

- Which factory should make what products?
- How should scarce raw materials and capacity be allocated?
- Which transportation modes should be considered?
- What is the impact of alternative strategies for all of the above?

powerful solving capabilities

RHYTHM Master Planner's solvers are configured in a way that allows you to prescribe objectives in a customizable sequence reflecting your preferences. Consider two conflicting objectives—satisfy all forecasts (if possible) but avoid shipments from DC to DC (if possible). For some of you, the first objective is more important than the second one because customer service comes first. However for others, the second is more important than the first one because you don't believe the forecast anyway. Competitor's approaches for allowing you to articulate your preferences force you to specify artificial "penalty costs" which are not only difficult to assign a value to, but significantly compromise your ability to interpret the results. RHYTHM Master Planner deals with "real" metrics—so you'll understand the answers intuitively because they actually mean something!

unique features of RHYTHM Master Planner

- **advanced mathematical optimization**—proven, advanced mathematics ensure objectives are optimized to match business requirements
- **resource allocations**—to production locations and production lines in a way that ensures scarce capacity is consumed in an optimal manner
- **inventory builds**—when required to satisfy high seasonal demands
- **trade-offs**—between overtime production and building inventory
- **flexible sourcing**—of distribution centers from multiple production locations

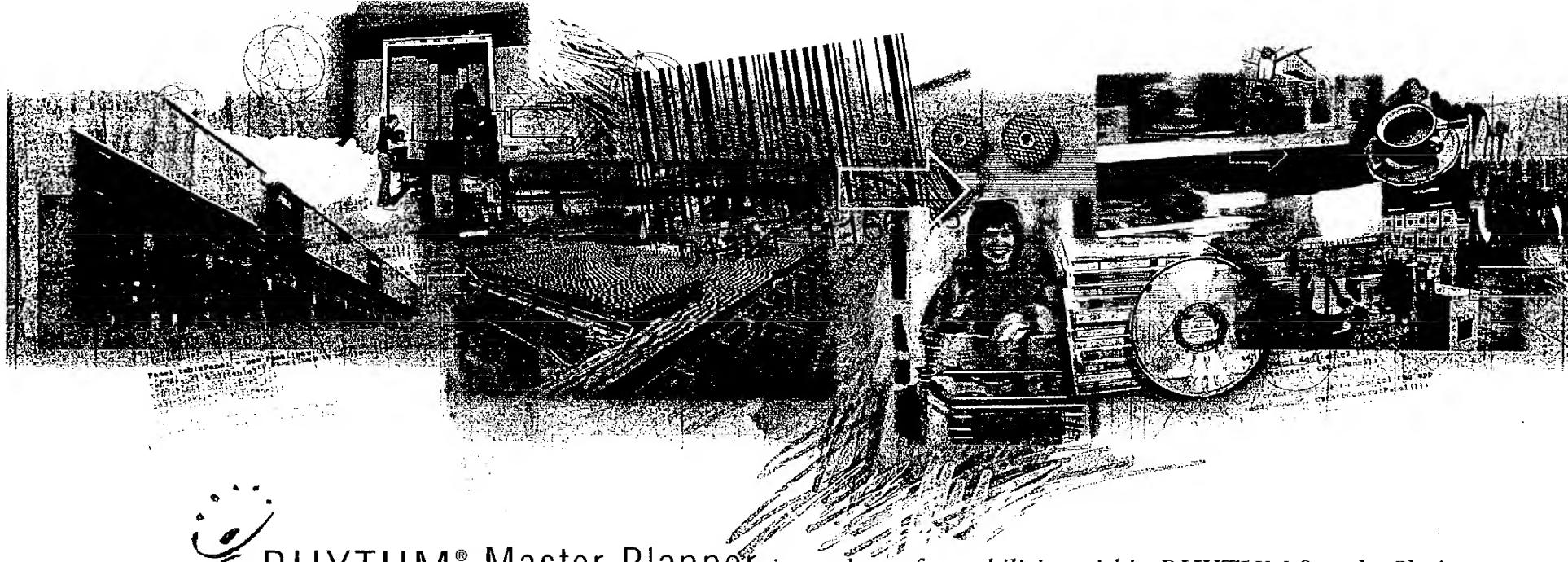
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master planner

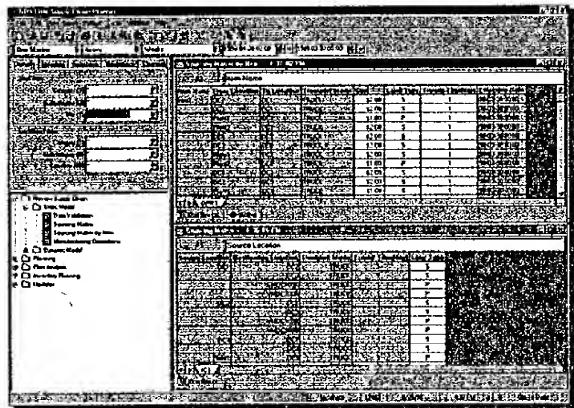


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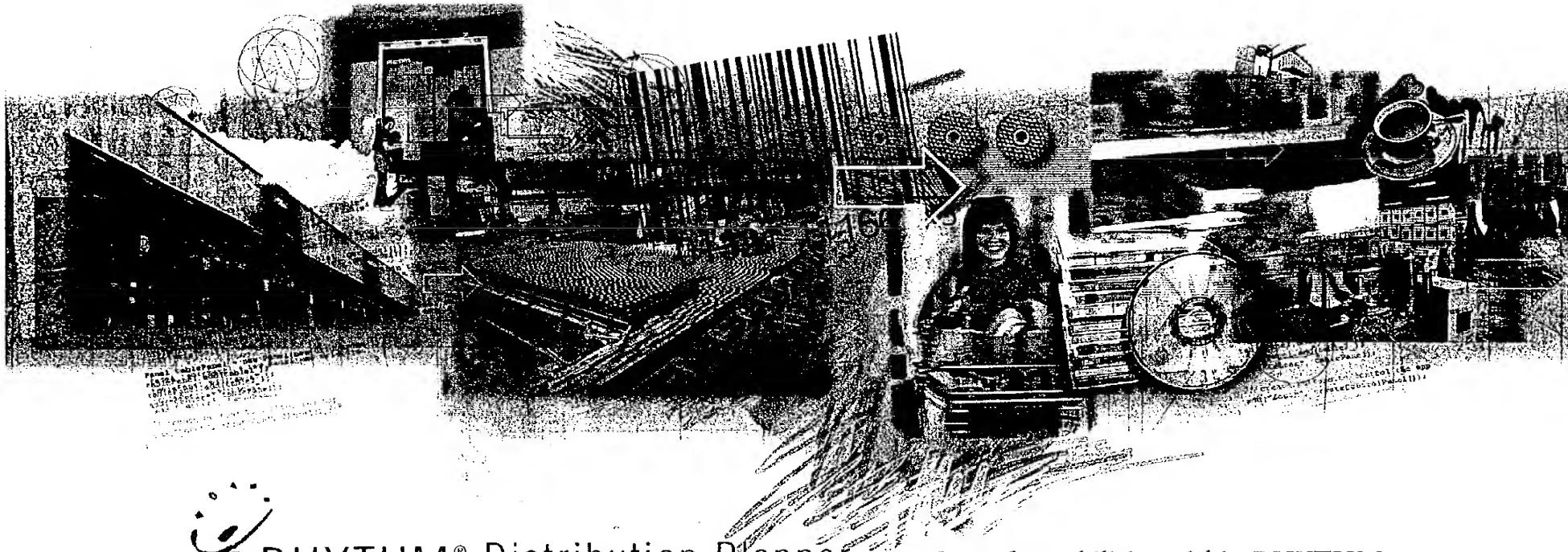


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distribution planner



RHYTHM® Distribution Planner is a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated planning architecture. It enables logistics managers to create operating plans that meet the global objectives of the supply chain. In contrast with traditional approaches such as distribution requirements planning (DRP), RHYTHM Distribution Planner's technology and architecture extends the current set of capabilities to address new and emerging Consumer Packaged Goods (CPG) supply chain challenges.

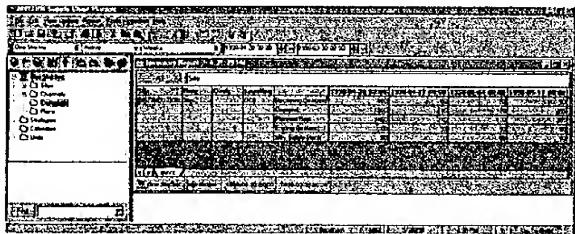
fundamental planning principles

Operational planning and scheduling within CPG companies is characterized by interdependencies among plans and by disperse planning responsibilities. It is extremely important for a company to have one unified representation of its entire supply chain that enables global planning visibility. RHYTHM Distribution Planner provides these capabilities and is a fundamental element of i2's CPG industry solution.

RHYTHM distribution planning solves complex problems

RHYTHM Distribution Planner derives net requirements and produces deployment plans. As a requirements planning tool, its customer-focused approach determines future stock requirements needed to meet anticipated customer demands and assigns them to sources of supply. As an inventory deployment tool, it schedules movements of stock to meet immediate demands while making optimal use of on-hand inventory and respecting limited handling and storage capacities. RHYTHM Distribution Planner deals with such issues as "prioritized fair-sharing" to ensure high-priority needs are met before low-priority needs.

distribution planner



intelligently differentiating customer service

In today's global marketplace, CPG companies are under more and more pressure to increase service, measured in both availability and speed of response, while simultaneously lowering costs. RHYTHM Distribution Planner helps you intelligently differentiate customer service. It has visibility of customer level demands—not only just the relative priority of a customer but also the relative priority of the reason why the customer needs to be replenished (turn goods, promotional goods or safety stock). More importantly, it maintains this visibility throughout all levels of the supply chain structure. The result—significantly better utilization of resources, which translates into higher service levels and lower costs!

flexible supply chain representation

RHYTHM Distribution Planner enables comprehensive and accurate representation of supply chain structures. It allows you to incorporate flexible sourcing options, overflow DCs, co-packing operations, assembly requirements and transportation options into the planning process.

cost driven optimization

RHYTHM Distribution Planner distinguishes itself through its ability to simultaneously consider constraints such as manufacturing, handling and storage capacities, etc. throughout the entire supply chain. Furthermore, it optimizes on a cost basis and adjusts sourcing in response to the constraints.

unique features of RHYTHM Distribution Planner

- **advanced mathematical optimization**—proven, advanced mathematics ensures objectives are optimized to match business requirements
- **satisfy demand by priority**—specify demand by priorities by customer (e.g., orders vs. forecasts) and satisfy high-priority demands first
- **multiple levels of safety stock**—ensure all locations receive critical stock before any location gets additional stock
- **supports VMI**—VMI planning is integrated into the overall planning process
- **storage and handling capacity constraints**—plan in light of limited storage space and limited capacity to ship and receive product
- **“push” and/or “pull” distribution**—capacity limitations at plants may force product to be pushed while customer service at warehouses may cause product to be pulled

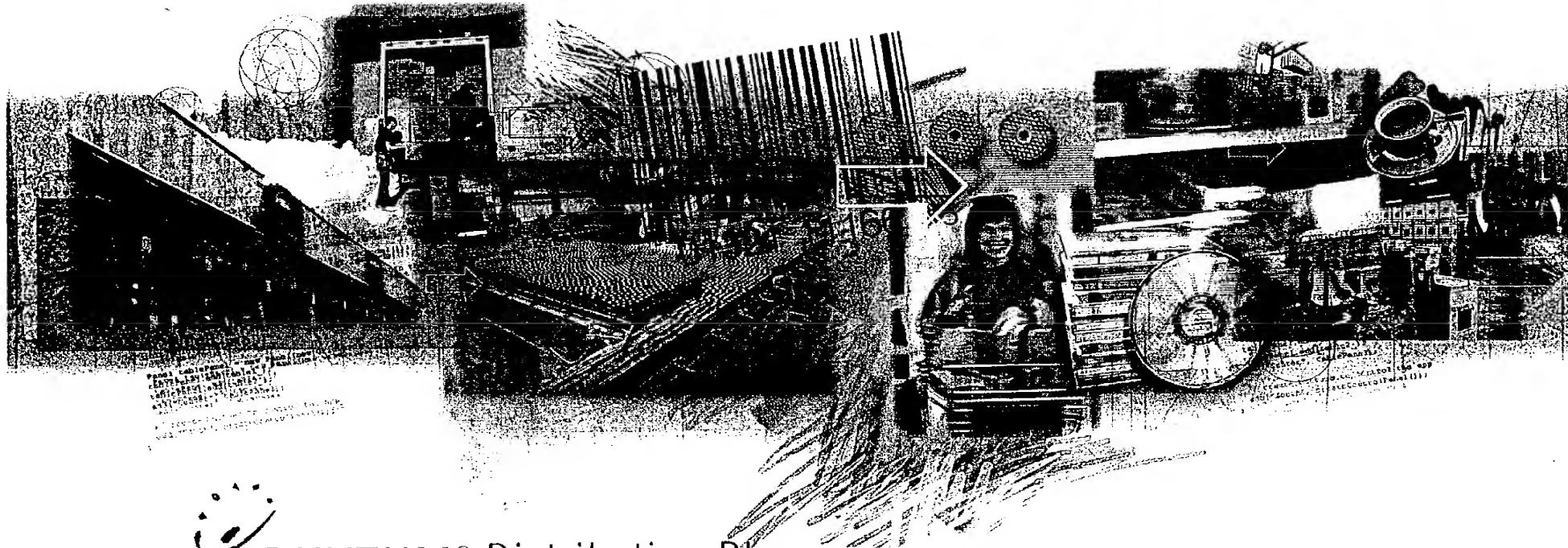


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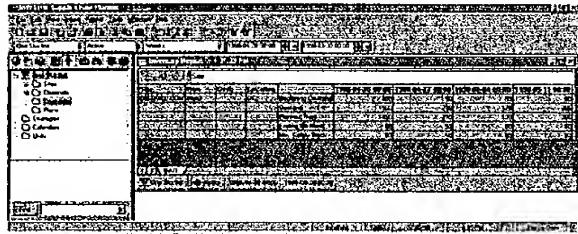
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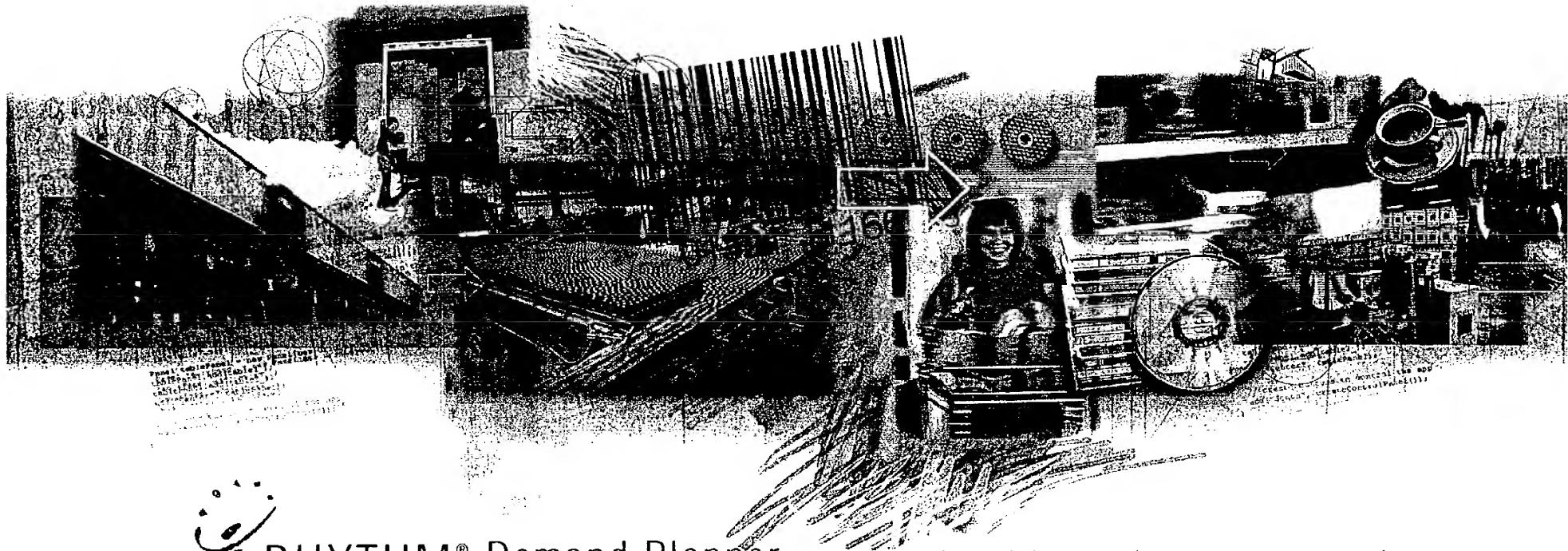


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demand planner



RHYTHM® Demand Planner is a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated planning architecture. Understanding demand and managing factors that impact demand have become increasingly critical to the success of most organizations. RHYTHM Demand Planner factors in seasonal fluctuations, economic conditions, promotions, pricing, competitors' activities, and the actions of key customers into the demand planning process.

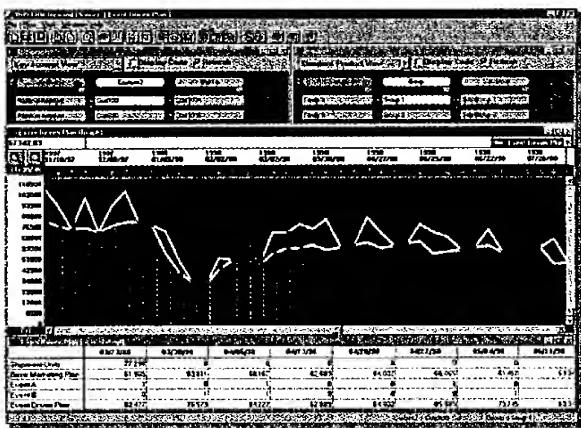
fundamental planning principles

Usually, various departments such as manufacturing, logistics, sales, marketing, and finance create their own frequently conflicting forecasts. Such approaches are standard since commonly used demand planning tools do not support the ability to generate, store and evaluate multiple plans, incorporate input from any number of internal or external sources, consider causal factors, and effectively manage consolidation of conflicting plans. RHYTHM Demand Planner fully supports internal and external collaboration, aligning all of the various plans into a consensus plan.

RHYTHM demand planner solves complex problems

RHYTHM Demand Planner provides a demand planning environment that combines the best statistical techniques, unlimited causal factors, and the ability to manage multiple inputs with multi-dimensional data representation and analysis in a user-friendly environment. Using RHYTHM Demand Planner, planners can accurately model their business in real-time—helping users to be more responsive, and helping organizations greatly reduce forecast error, increase planning accuracy, and link the planning process directly to strategic goals.

demand planner



multi-dimensional representation of demand

RHYTHM Demand Planner is unique in its ability to manage demand in multiple dimensions. Dimensions are the different levels or definitions through which the user can interact with the data. These dimensions might be geography, products, plants, distribution centers, accounts or customers. Through this capability, users of RHYTHM Demand Planner manipulate demand plans in the context of their part of a business process. Additionally, you can define time in a hierarchy of increments such as weeks, months and quarters.

top down, bottom up or middle out

Forecasts derived or adjusted at a national level may be allocated down, for example, to a territory level. Forecasts derived at a SKU level can be added up so the effect is reflected at all higher levels. If you derive a forecast at the district level, any changes made can be allocated down to territories and summarized up to the national level.

internet focused

RHYTHM Demand Planner provides full access to demand planning information across intranets and the Internet. There is no requirement to build custom web pages or user interfaces. A standard web browser can invoke the underlying business objects.

unique features of RHYTHM Demand Planner

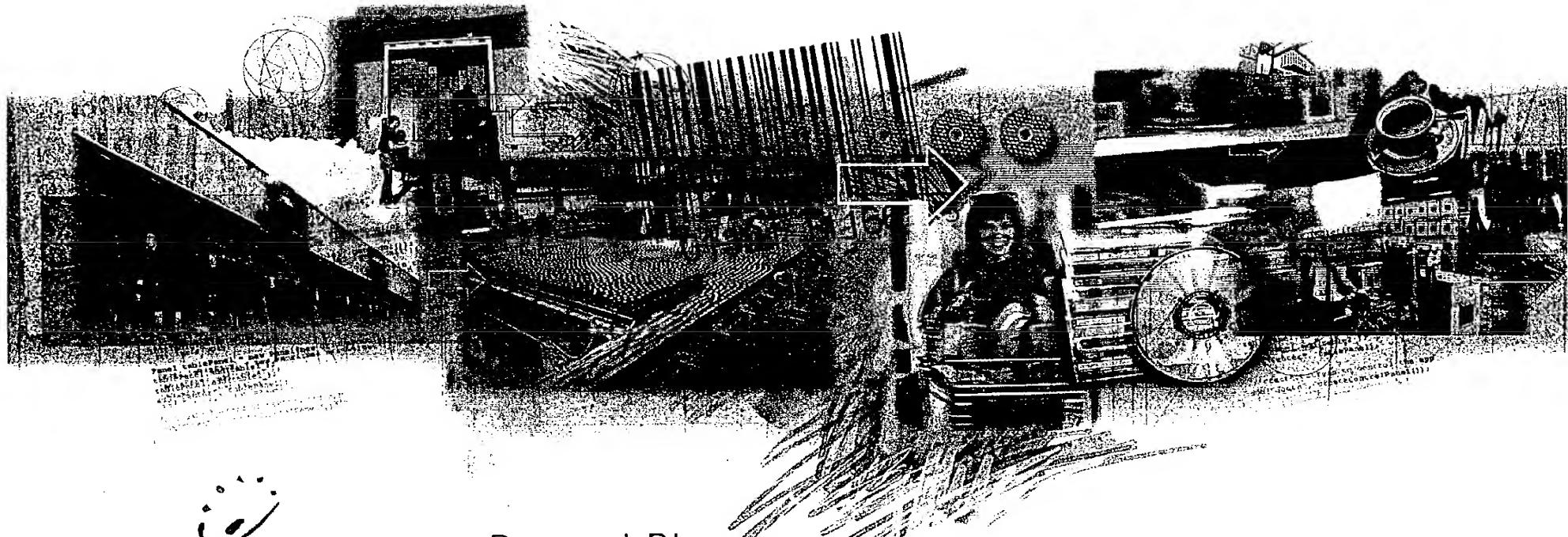
- **superior allocation capabilities**—Any technique used to forecast can be also used to allocate. Or, a technique may be used exclusively for allocation. For example, a simple moving average may be a poor forecasting technique, but work great for allocation.
- **flexible forecasting techniques**—delivered with 35 forecasting techniques including the ability to automatically Pick Best
- **bookmarks**—save work sessions with bookmarks; return to your work, open the bookmark and continue where you left off
- **unlimited capability to utilize causal factors**—incorporate an unlimited number of causal factors, such as promotional events, into your forecasting models
- **new product introduction**—derive forecasts for new items by simultaneously considering attributes from multiple existing items

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demand planner



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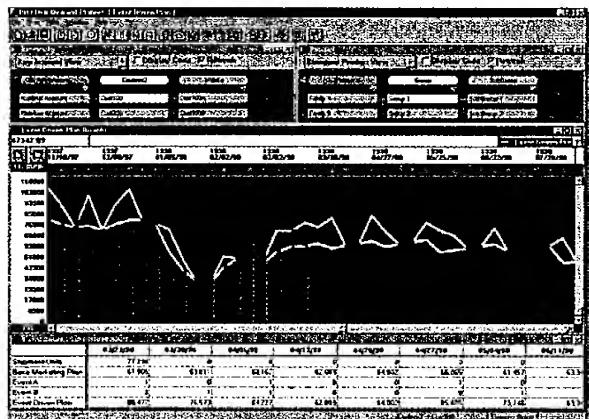
fundamental planning principles

Usually, various departments such as manufacturing, logistics, sales, marketing, and finance create their own frequently conflicting forecasts. Such approaches are standard since commonly used demand planning tools do not support the ability to generate, store and evaluate multiple plans, incorporate input from any number of internal or external sources, consider causal factors, and effectively manage consolidation of conflicting plans. **RHYTHM Demand Planner** fully supports internal and external collaboration, aligning all of the various plans into a consensus plan.

RHYTHM demand planner solves complex problems

RHYTHM Demand Planner provides a demand planning environment that combines the best statistical techniques, unlimited causal factors, and the ability to manage multiple inputs with multi-dimensional data representation and analysis in a user-friendly environment. Using **RHYTHM Demand Planner**, planners can accurately model their business in real-time—helping users to be more responsive, and helping organizations greatly reduce forecast error, increase planning accuracy, and link the planning process directly to strategic goals.

demand planner



multi-dimensional representation of demand

RHYTHM Demand Planner is unique in its ability to manage demand in multiple dimensions. Dimensions are the different levels or definitions through which the user can interact with the data. These dimensions might be geography, products, plants, distribution centers, accounts or customers. Through this capability, users of RHYTHM Demand Planner manipulate demand plans in the context of their part of a business process. Additionally, you can define time in a hierarchy of increments such as weeks, months and quarters.

top down, bottom up or middle out

Forecasts derived or adjusted at a national level may be allocated down, for example, to a territory level. Forecasts derived at a SKU level can be added up so the effect is reflected at all higher levels. If you derive a forecast at the district level, any changes made can be allocated down to territories and summarized up to the national level.

internet focused

RHYTHM Demand Planner provides full access to demand planning information across intranets and the Internet. There is no requirement to build custom web pages or user interfaces. A standard web browser can invoke the underlying business objects.

unique features of RHYTHM Demand Planner

- **superior allocation capabilities**—Any technique used to forecast can be also used to allocate. Or, a technique may be used exclusively for allocation. For example, a simple moving average may be a poor forecasting technique, but work great for allocation.
- **flexible forecasting techniques**—delivered with 35 forecasting techniques including the ability to automatically Pick Best
- **bookmarks**—save work sessions with bookmarks; return to your work, open the bookmark and continue where you left off
- **unlimited capability to utilize causal factors**—incorporate an unlimited number of causal factors, such as promotional events, into your forecasting models
- **new product introduction**—derive forecasts for new items by simultaneously considering attributes from multiple existing items



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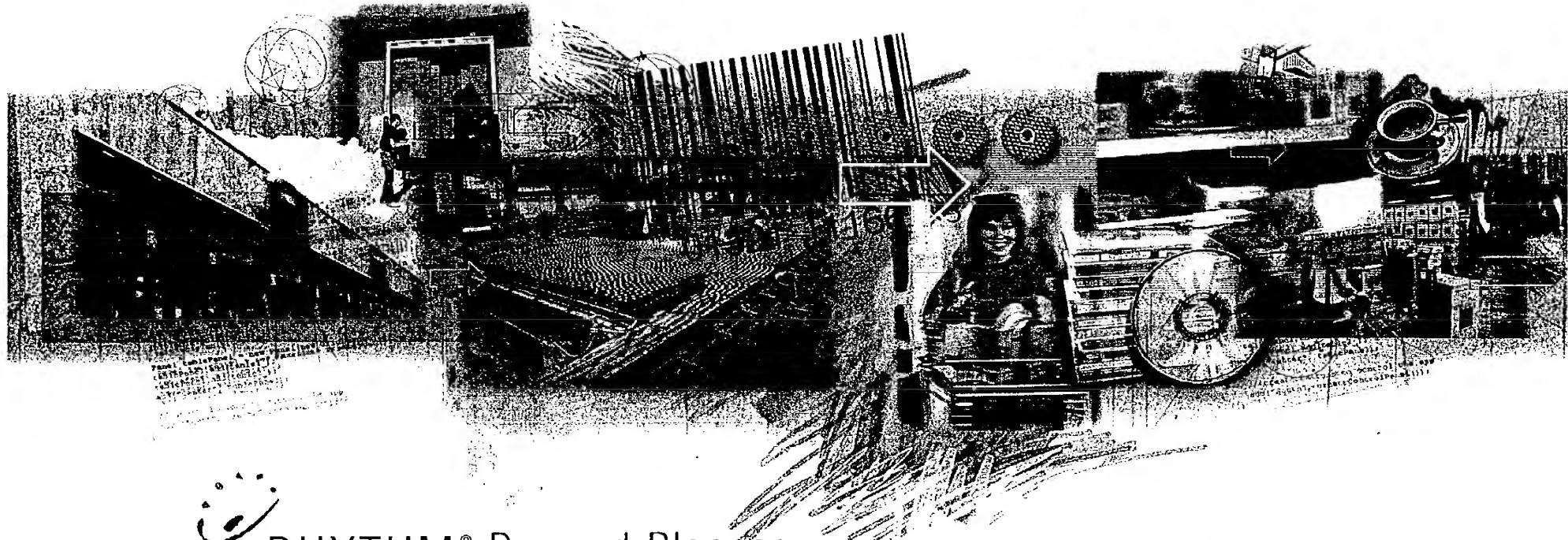
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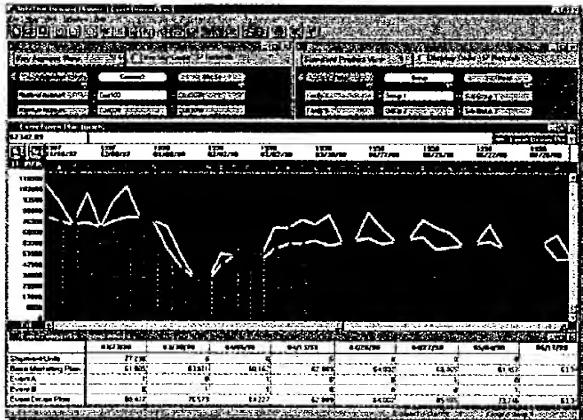
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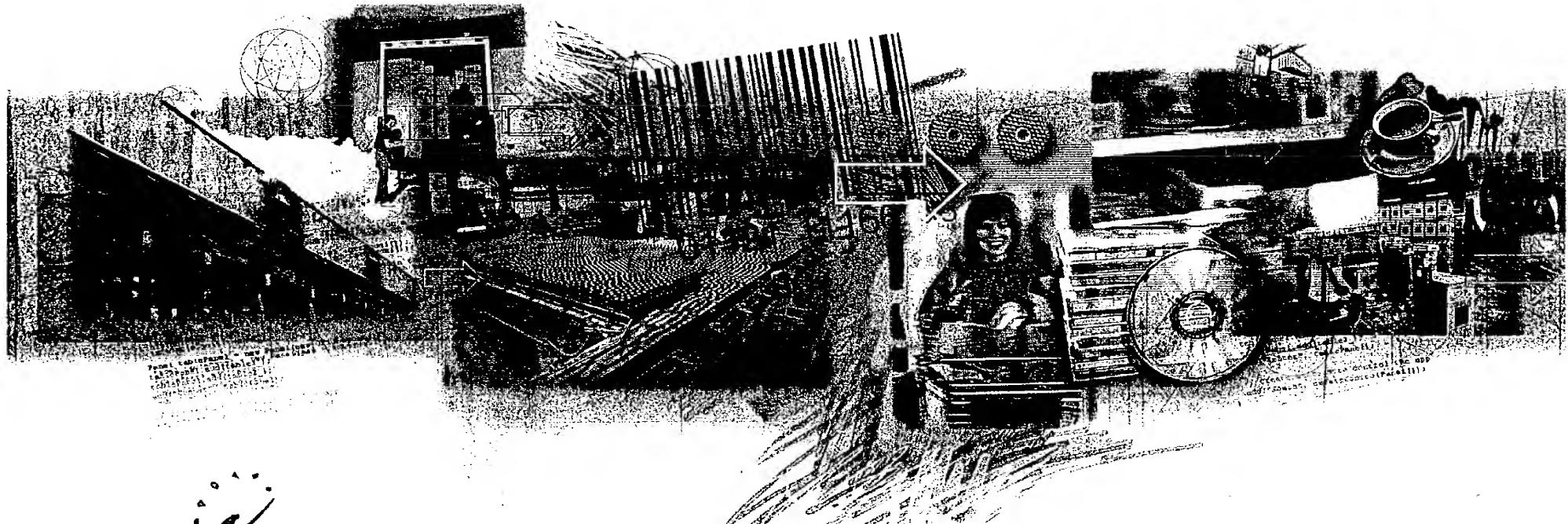
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carrier bid optimizer



RHYTHM® Carrier Bid Optimizer

Carrier Bid Optimizer provides a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated planning and scheduling architecture. It enables logistics managers within CPG companies to collaborate with carriers to drive out mutual shipper—carrier transportation cost. Shippers analyze, forecast, and format their transportation purchasing needs into a well-defined set of requirements. Carriers then perform additional analysis of the shipper's requirements and selectively price according to their efficiencies and their network, not the shipper's network. Result—the best possible use of transportation resources.

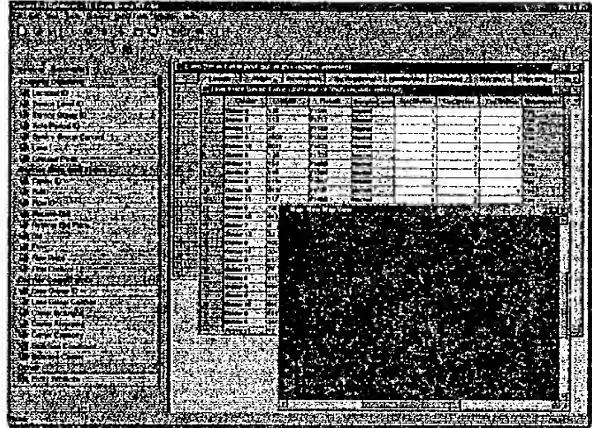
fundamental planning principles

Transportation bid optimization requires powerful mathematical solvers combined with real-world information about shipper demand requirements, carrier continuous move opportunities, costs and constraints. Rhythm Carrier Bid Optimizer incorporates all of these important aspects. This means it can deal effectively with a multitude of real-world transportation possibilities—including conditional pricing, seasonal demand requirements, multiple equipment requirements, multiple transportation modes, differing service objectives and varying carrier capacities.

RHYTHM carrier bid optimizer solves complex problems

Transportation is perhaps the single most important supply chain constraint for CPG companies. Traditional optimization approaches consider opportunities after carrier rates have been negotiated. The prevailing wisdom argues that synchronization of shipper demand and carrier capacity can be achieved as part of a tactical plan—but in practice, this is rarely feasible. Since RHYTHM Carrier Bid Optimizer considers shipper-carrier continuous move opportunities and carrier defined combinatorial bids, it generates a globally feasible awarding plan which optimizes transportation asset utilization during the planning process, not the execution process.

carrier bid optimizer



resolve planning obstacles

RHYTHM Carrier Bid Optimizer resolves a variety of obstacles to effective transportation planning. Some origin-destination lanes have significant seasonal variability of demand while others may have seemingly random variability. Some lanes may require strict adherence to defined delivery schedules while others may require less exacting discipline. Because of the different back-haul opportunities of the lanes at bid, a group of lanes could be aggregated into a single lane for some carriers, but not all carriers. Sometimes a carrier can allocate more resources to one part of the shipper's network than other parts of the network. RHYTHM Carrier Bid Optimizer makes sense out of all this chaos and saves you money in the process.

unique features

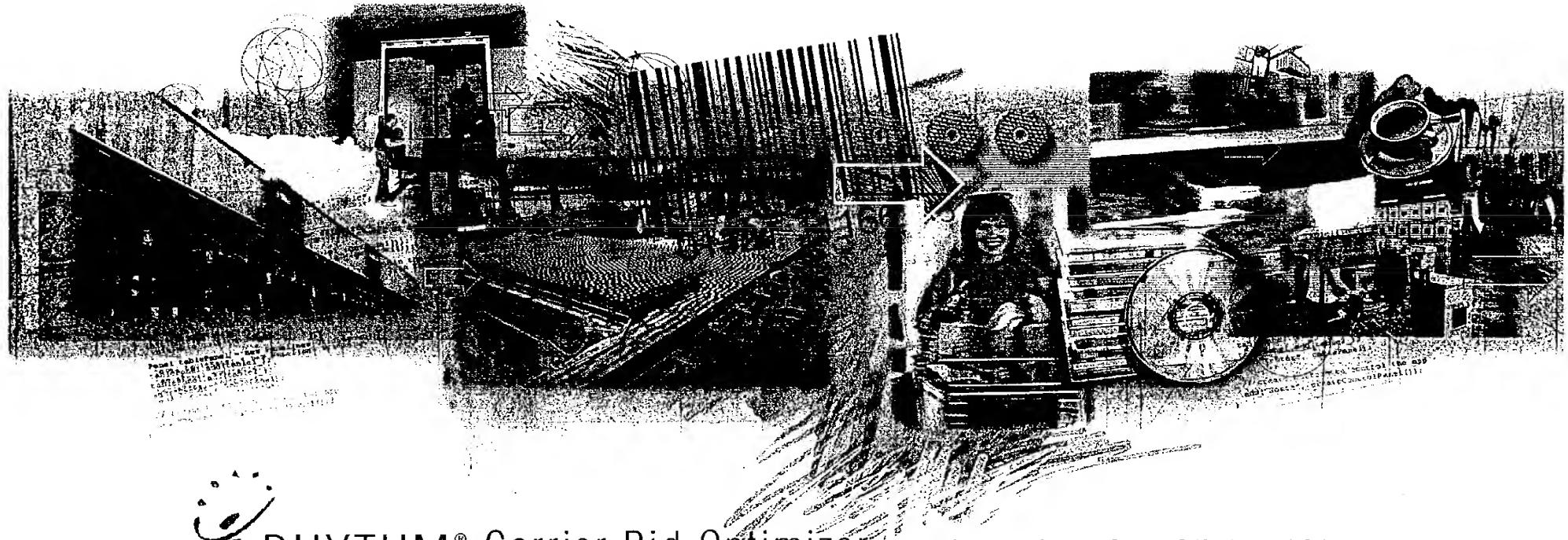
- **advanced mathematical optimization**—proven, advanced mathematics factor service, capacity and total network cost issues into carrier selection and strategic transportation planning
- **multi-modal analysis**—can be applied to truckload, inter-modal, LTL, ocean and parcel transportation
- **demand variability analysis**—can differentiate between different levels of demand accounting for seasonal and promotional spikes
- **continuous move identification**—can identify more combinatorial opportunities by searching across both the shipper's and carrier's networks for possible continuous moves
- **time of delivery analysis**—can distinguish between different times, allowing carriers to balance asset utilization across time of day
- **memory resident data structure**—proven, advanced data structure makes bid submission and bid analysis easier, allowing shippers and carriers to focus on asset utilization, not bid mechanics

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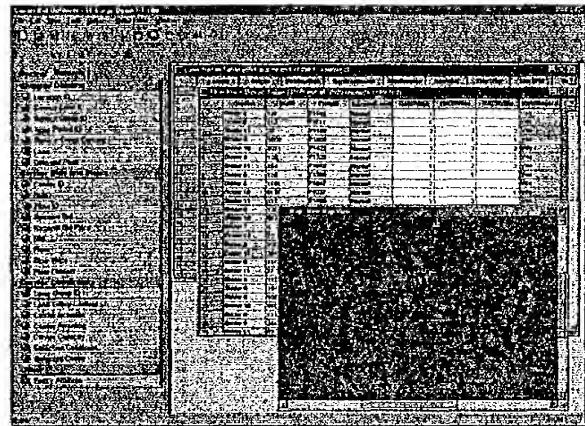
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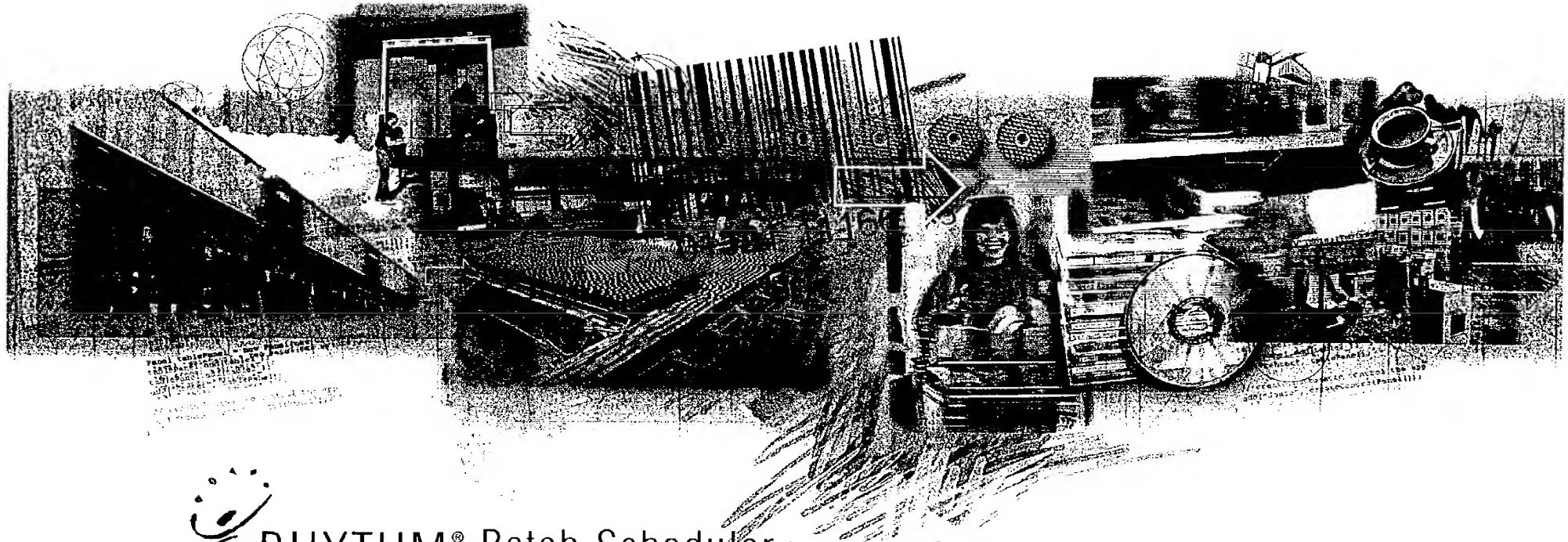
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10K BP DS-10326/98

batch scheduler



RHYTHM® Batch Scheduler is a subset of capabilities within RHYTHM Supply Chain Planner's tightly integrated supply chain planning architecture. It creates detailed production schedules that allow you to maximize throughput, increase flexibility and reduce inventory—all increasingly important to Consumer Packaged Goods (CPG) companies as customers demand more varied product mixes than ever before.

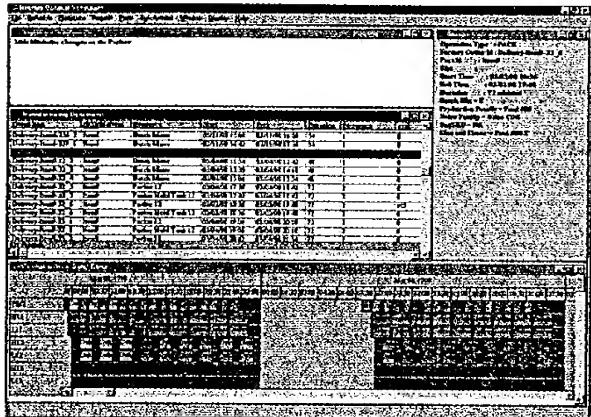
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Optimized production schedules have always been a goal for Consumer Packaged Goods (CPG) manufacturers. Achieving this goal, however, has been difficult because scheduling systems did not adequately address the unique requirements and constraints faced by CPG manufacturers. RHYTHM Batch Scheduler provides CPG manufacturers with the technologies to build detailed, realistic models that generate optimized production schedules. Most importantly, it does so within the context of optimizing overall supply chain plans.

RHYTHM batch scheduler solves complex problems

CPG manufacturing environments are typically characterized by relatively expensive setup/changeover costs and/or complex sequencing constraints such as precedence or transitions. RHYTHM Batch Scheduler offers new technology for generating optimized detailed production schedules for CPG manufacturers: one employing genetic-algorithm-based scheduling, a constraint engine that allows you to model a broad range of detailed constraints and an overall architecture that permits you to mold the solution to the problem.

batch scheduler



optimized genetic algorithm-based scheduling

Genetic algorithms use the power of evolving populations to build progressively better schedules. This approach results in globally optimal schedules and sequences because it respects a balance of all constraints, not just the major ones. It also has the advantage of creating better schedules faster. RHYTHM Batch Scheduler can handle both complex constraints and a very large number of constraints in large part because the optimization algorithm is de-coupled from the constraint definition.

dynamic scheduler's interface

RHYTHM Batch Scheduler's interactive schedule editor offers schedulers a colorful, interactive, intuitive and CPG-specific user interface that is also highly customizable to the needs of each scheduler. It highlights constraint violations, exceptions and problems using color-coded displays. This makes re-scheduling and "what-if" scheduling simple, fast and powerful.

global multi-stage optimization

RHYTHM Batch Scheduler schedules multi-stage production such as "make-pack" or "make-pack-pack" with or without intermediate storage buffers. It creates detailed schedules at each stage while globally coordinating the production flow and trading-off constraints.

unique features

- **detailed schedules are part of an overall optimized supply chain solution**—works in conjunction with other RHYTHM Supply Chain Planner components to optimize plans and schedules across the entire supply chain
- **varying levels of time granularity and scheduling horizon**—horizons can go out weeks into the future with time expressed in minutes for the first few days
- **incorporate upstream and downstream constraints**—upstream constraints include ingredients and packaging material availability, downstream constraints include finished goods inventory and logistics

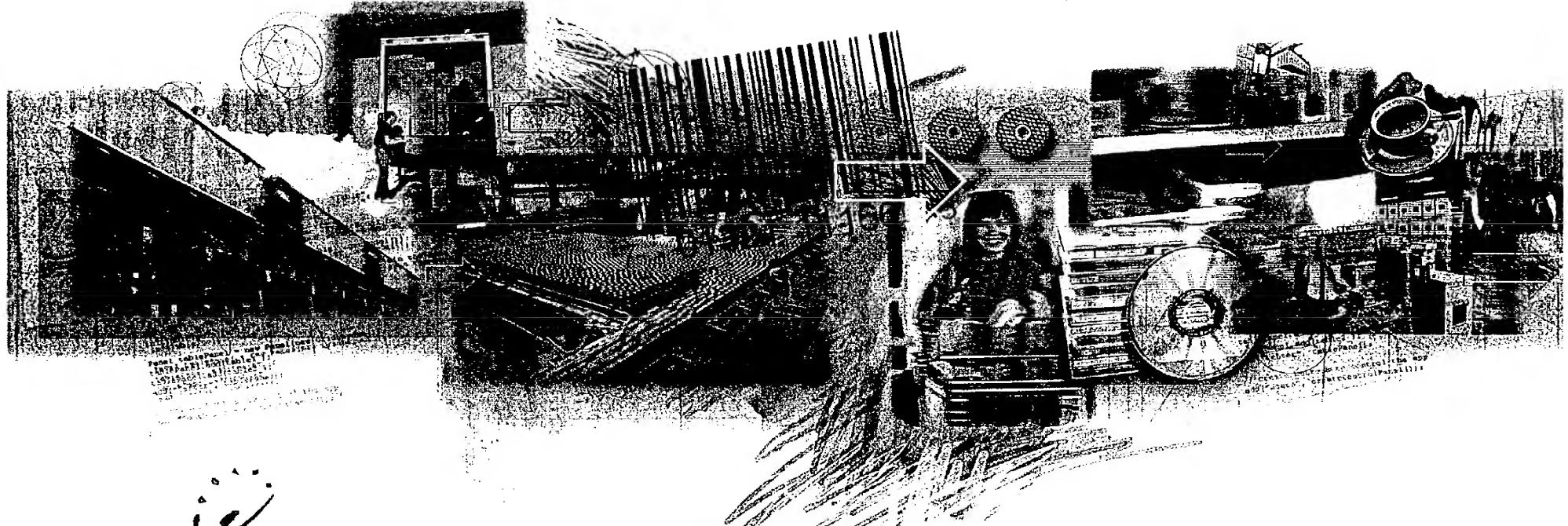
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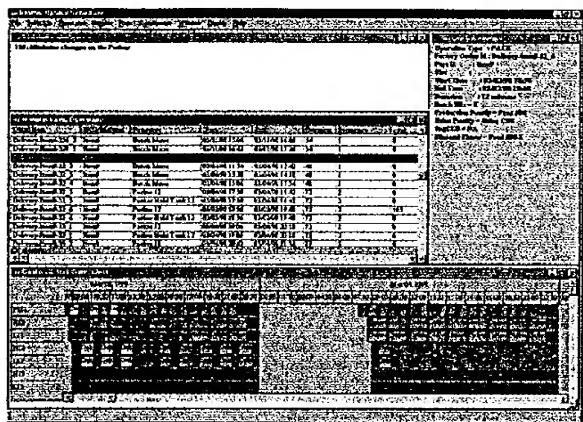
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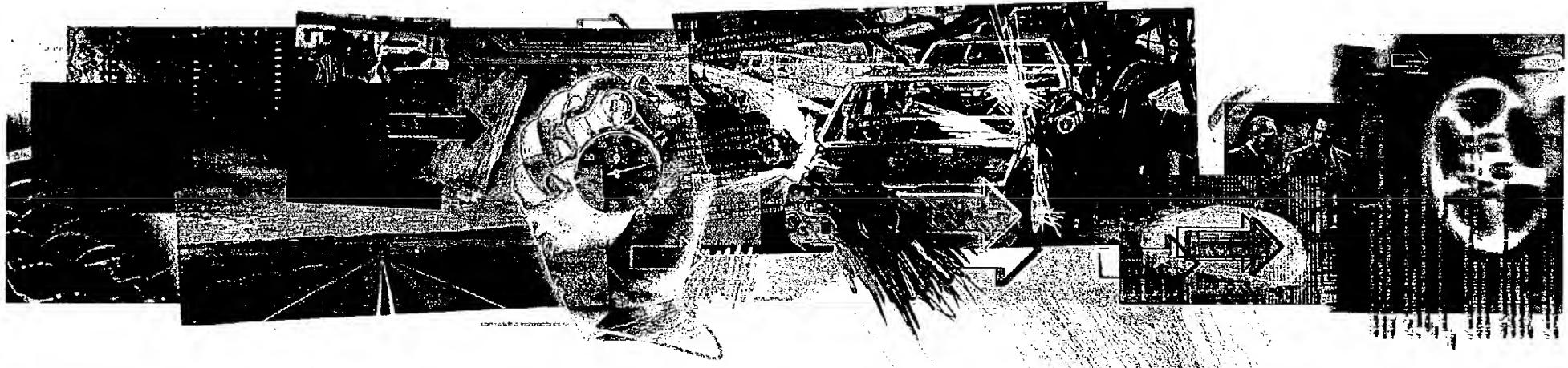
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vehicle sub-system planning



RHYTHM® Vehicle Sub-system Planning helps Tier 1 system integrators coordinate the complex manufacturing and logistics required to build complete vehicle sub-systems. Global planning and scheduling ensures shipments arrive within OEM final assembly windows. Manufacturing synchronization enables multiple plants and enterprises to respond in a coordinated fashion. Logistics planning ensures components from various suppliers converge simultaneously.

problem: increased planning complexity

Tier 1 suppliers' roles have undergone significant structural change in recent years. Many have become complete system integrators who must coordinate components from various suppliers and assemble them into vehicle sub-systems.

These systems integrators face significantly increased planning complexity. They must deal with disparate systems in allied and non-allied plants, isolated data, and geographically dispersed supply networks. One solution is to add inventory and capacity to handle the added complexity. However, this asset-intensive approach has a sizable incremental cost and does not address the fundamental manufacturing and logistics issues.

solution: optimized manufacturing planning and flow logistics

With RHYTHM's Vehicle Sub-system Planning solution, system integrators coordinate assembly and delivery of vehicle sub-systems without excess inventory and capacity. This solution gives planners the ability to perform complex planning tasks across multiple enterprises. It gives them global visibility of operations and the ability to collaborate to achieve synchronized deliveries.

vehicle sub-system planning

continued

A feasible constraint-based plan is created for each plant. The plan considers due dates for each module, material availability and productive capacity. Planners use exception-based windows to proactively solve problems for timely deliveries. Advanced optimization techniques maximize throughput and increase the material flow velocity. These techniques handle both sequence dependent set-ups and flow manufacturing environments.

A global model synchronizes the individual plants to the OEM assembly order, enabling all plants to produce to a specific vehicle sequence. Time-phased inventory planning manages a series of strategic buffers in the supply chain.

This solution also helps procurement planners collaborate with Tier 2 suppliers and consider their constraints in producing schedules. Updated requirements and responses are shared over intranets and the Internet. RHYTHM's advanced system architecture enables plans to be continuously improved based on the inputs from all supply chain participants.

The logistics command and control capability monitors multi-enterprise operations, extending to geographically dispersed supplier facilities. Logistics managers see both inventory moving through the supply chain and in-process manufacturing orders. Graphical models monitor and measure the performance of the individual supply network elements. Execution failures in the transportation plan generate visual alarms, notifying users that the plan is in jeopardy and triggering analysis of alternatives.

benefits - cost-effective coordination

Tier 1 Systems Integrators are able to deliver material and supply coordination with increased overall margins. This includes:

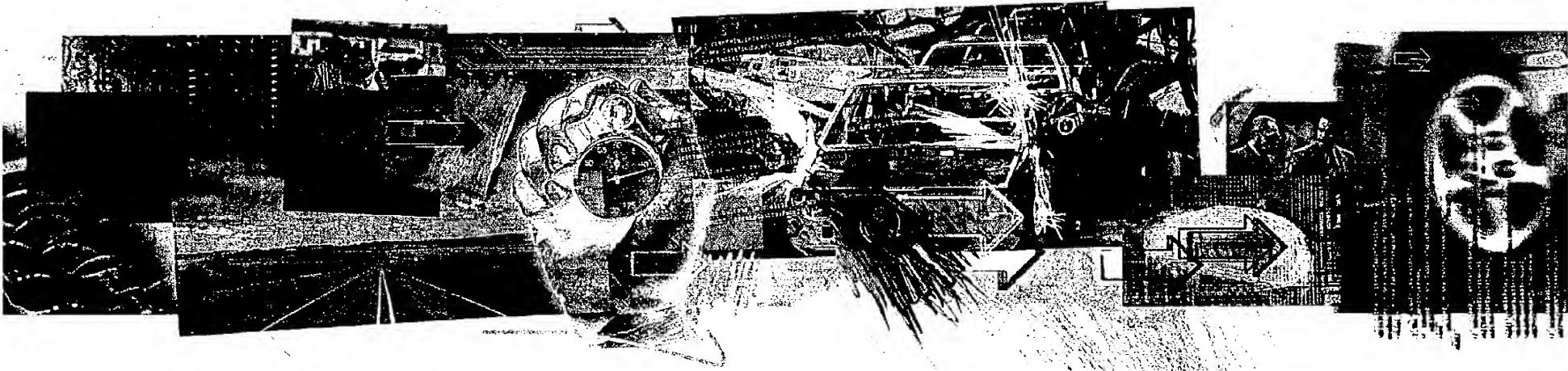
- **increased ROA**—Less inventory and capital is used to achieve the same or better results. One manufacturer improved asset utilization by 112% and return on assets by 40%.
- **reduced lead time**—Better coordination and less inventory reduces lead times. One manufacturer reduced their lead time to customers by 33%.
- **increased direct shipments**—Better coordination enables integrators to eliminate non-value-added consolidation points. One office furniture company reduced the number of indirect customer shipments by 50%, significantly reducing costs.



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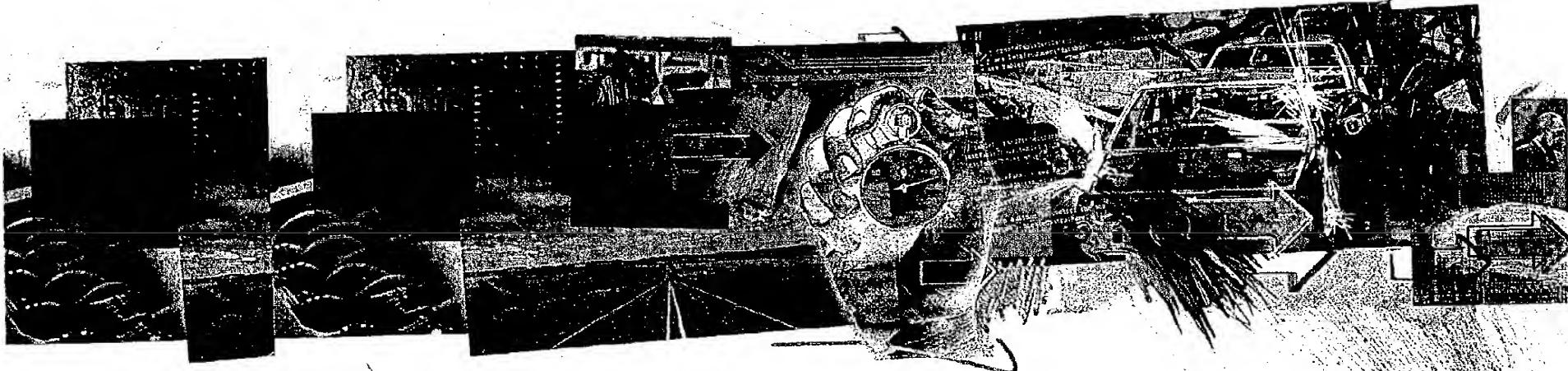
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vehicle**vehicle make-to-demand planning**

RHYTHM® Vehicle Make-to-Demand Planning™ is a complete, end-to-end planning solution for vehicle and equipment manufacturers. It encompasses the entire supply chain, from the distribution/dealership level down to suppliers. By obtaining information from all sources, it identifies demand-supply mismatches early, and creates more stable production schedules. In addition, it captures and addresses both actual and forecasted demand, bringing a true "make-to-demand" to vehicle production.

problem: capturing market demand and supplier constraints

Most vehicle manufacturers create production plans that are not fully integrated with the supply chain. Typically, they are not integrated with their dealerships, which are loosely linked with their suppliers. Therefore, they often fail to capture market demand and do not fully consider the supply chain's capability to meet it.

As a result, production planners and corporate strategists do not receive timely warning of critical supply constraints. They cannot allocate supply across the network appropriately. They must build excess inventory in the distribution network and over invest in plant capacity to accommodate unpredictable production schedule changes. Finally, they are unable to easily determine the impact of long term investments, production sourcing decisions, new market entry and market trends.

solution: optimized make-to-demand planning

RHYTHM Vehicle Make-to-Demand Planning captures market demand and supplier constraints. It develops feasible and optimized master production schedules by balancing demand with corporate resources and objectives. It handles capacity, component availability, labor and transportation.

vehicle make-to-demand planning

continued

This solution starts with a model of the supply and dealer network. Applying demand to the model identifies vehicle or controlled commodity constraints. Then the system makes product allocations to market channels using standard or custom allocation strategies. It intelligently levels production across the month and dynamically sources demand to vehicle, component and sub-assemblies facilities according to business rules.

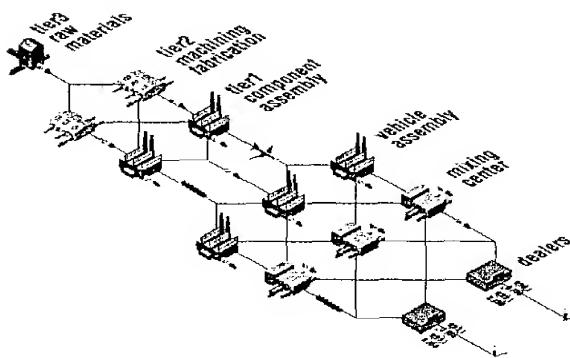
RHYTHM employs an integrated planning environment with comprehensive visibility into a single integrated sales and production plan. Exceptions or problems are immediately reported to the planner, so that all issues can be resolved either interactively or automatically. It provides users instant metrics comparing profitability, market share, capacity utilization and inventories for the committed and "what-if" production plans.

Production and demand plans may be quickly adjusted to meet changing marketplace conditions. Planners can monitor the consumption of allocations and net available to promise (ATP) products. Near-term forecasts are easily updated based on feedback of timely field data. Planners can proactively influence demand with incentives, boost or decrease supply targets or make sourcing decisions from alternate plants.

benefits: stable, optimized production

RHYTHM Vehicle Make-to-Demand Planning balances demand, supply and resources to globally optimize operations vis-a-vis corporate goals. It meets customer demand projections while bringing production schedule stability to the entire supply chain. The result is improved delivery performance and higher margins for dealers and OEMs. Additional benefits include:

- **reduced planning cycle time**—Speed is an important benefit of improved planning. Many companies reduce planning cycle time by a third or more.
- **improved delivery promise accuracy**—Within five months, one manufacturer increased its main customer service metric, order shipment accuracy, by 25 percent.
- **increased return on assets**—One leading manufacturer increased its return on invested capital from 20 percent to more than 80 percent in less than two years.



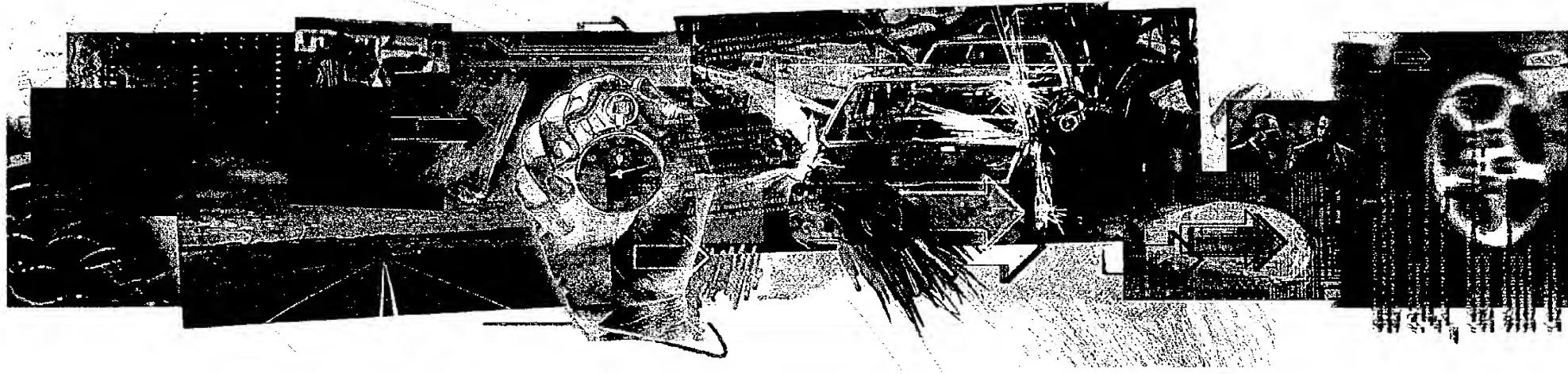
RHYTHM Vehicle Make-to-Demand Planning encompasses the entire supply chain, from the distribution/dealer network to suppliers.



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vehicle demand fulfillment



RHYTHM® Vehicle Demand Fulfillment™ is a complete fulfillment solution for the automotive and industrial equipment industries. It includes order configuration, order tracking, and integration to supply chain planning systems. By linking order configuration directly to advanced planning, it insures not only technically correct configurations, but also production feasible configurations and accurate delivery dates.

problem: outdated fulfillment systems

Many vehicle and equipment manufacturers are transitioning to “customer-driven” enterprises, focused on delivering the right unit to the customer in a short time. But most planning and demand fulfillment systems were not designed for quick configure-to-order deliveries. Instead, these ordering systems often create lengthy order times, allow entry of unbuildable orders, track orders poorly and give unreliable or indefinite delivery dates.

The underlying problem is lack of visibility into the supply chain. These ordering and configuration tools are not integrated into the supply chain planning process. They lack the required speed, flexibility, functionality and global architecture. They may also rely on fixed lead times, assumptions of unconstrained capacities, and untimely information. Therefore, they do not determine promise dates that can be met reliably while respecting the business rules of the supply chain. Nor do they promise orders to optimize the business’ profitability, revenues or other strategic goals.

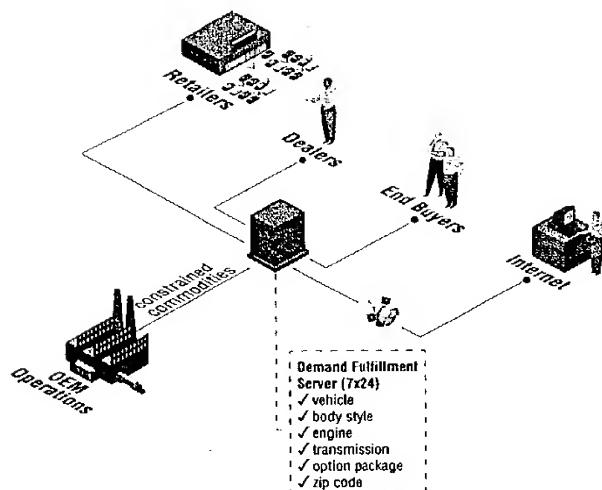
solution: orders “configured-to-availability”

RHYTHM Vehicle Demand Fulfillment is a complete solution for constraint-based product configuration, flexible rule-based allocation management, order promising and order management. It takes in retail customer orders and converts them into sequenced stock production orders, while respecting the enterprises’ capabilities and goals. It employs fast and flexible optimization technology to ensure accurate delivery date quoting for orders on a 7x24 available-to-promise server.

vehicle demand fulfillment

continued

RHYTHM Vehicle Demand Fulfillment starts with a constraint-based configurator that can accept orders from a variety of sources including dealers, retailers, end buyers or the Internet. The configurator includes an e-commerce customer interface, a pricing engine with a robust document generator and an easy-to-use product maintenance engine.



By linking order configuration directly to advanced planning, RHYTHM Vehicle Demand Fulfillment insures feasible production configurations and accurate delivery dates.

RHYTHM®'s "configure to availability" process searches all available stock, pipeline and non-pegged stock orders to establish if the demand can be sourced without introducing a new production order. It matches the demand against current allocations or production plans to determine when and where the vehicle can be built. Changes may be made to a stock order, but a progressive freeze specification dictates which configuration changes are still available. Customers may be offered small variations in their desired configuration of options to obtain quicker delivery.

This solution insures that vehicles are strategically allocated to maximize profits or market share. It employs allocation rules such as first-come first served, prioritized allocation, fair share or turn-and-earn. Allocation is flexible and can be concurrently deployed in multiple ways for different businesses, products and market hierarchies.

The solution architecture is designed for speed, scalability and high availability. It provides 24 hour, 7 day support within a distributed environment. To ensure scalability and quick response, it coordinates the ordering process among many available-to-promise servers, with each server assigned to a range of products.

benefits: fast accurate delivery

By ensuring fast, accurate delivery, RHYTHM Vehicle Demand Fulfillment improves customer service levels and profitability of the entire fulfillment chain. This includes:

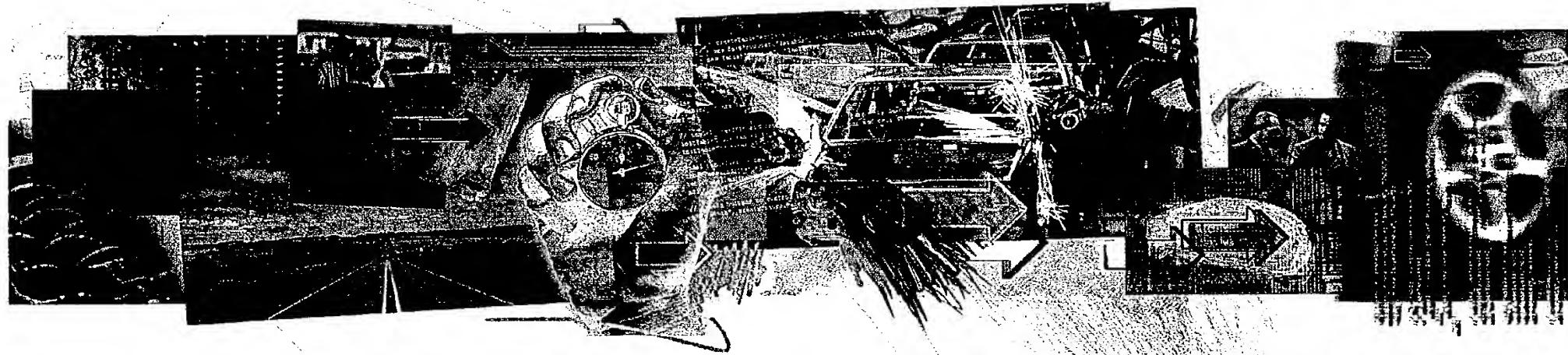
- **improved customer service**—Fast, accurate order configuration allows dealers to make promises that they know they can keep. Dealers can quickly match customer desires against the supply chain's production and delivery.
- **increased revenue and profitability**—The configure-to-availability process directs allocated units to the market channels where they are needed most and reduces the number of unwanted units sent to dealers. Less price discounting and product switching generates higher profit margins.
- **decreased costs**—Substantial savings are gained through more stable schedules, reduced transportation, inventories and financing.



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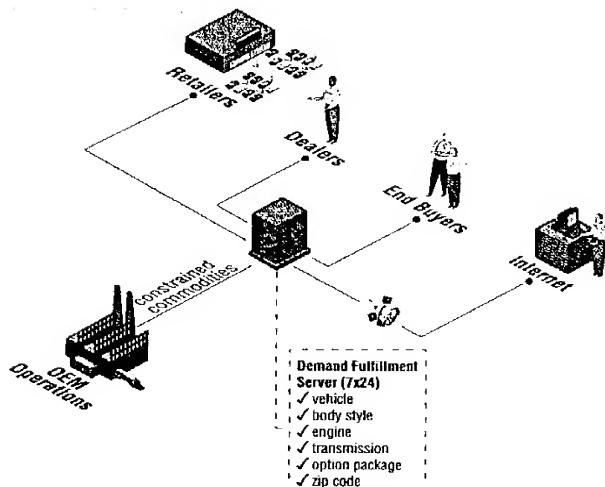
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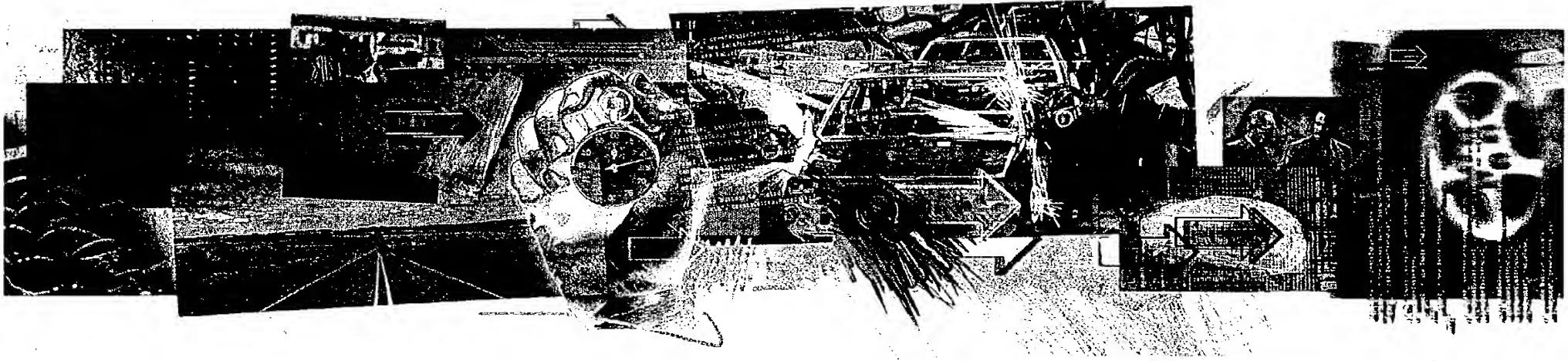


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DS-326 09/98

rapid response assembly



RHYTHM® Rapid Response Assembly helps suppliers optimize make-to-stock production, while postponing most make-to-order finished goods assembly until triggered by Just-In-Time (JIT) demand signals. With this solution, suppliers can postpone large amounts of final product assembly, while building stock in longer lead time components. The result is a more profitable strategy for meeting customer demands.

problem: supplying the right product mix

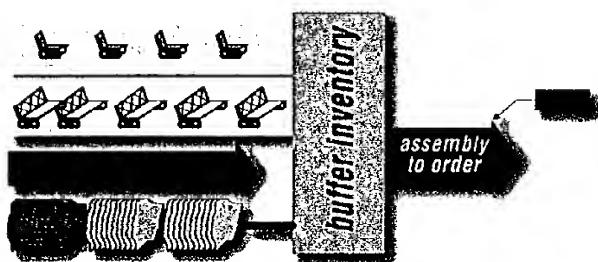
Lean manufacturing may provide suppliers less than a few days' visibility to respond to JIT demand signals from OEMs. These signals include ANSI and 866 EDI transactions in North America, and DELJIT and SYNCRO in Europe and Asia.

To meet these delivery requirements and prevent being caught with incorrect quantities or mix, suppliers often build large finished goods buffers as cushions. However, these buffers are expensive and sometimes risky. Capital is tied up, floor space is occupied, and assets and labor are consumed on product that may become aged, damaged or obsolete. If sufficient demand does not materialize to consume the buffer stocks, the supplier must discount or offer other incentives to move the goods.

solution: postponing assembly

RHYTHM allows manufacturers to delay finished goods assembly by strategically building less expensive stock. As much final product differentiation as possible is postponed until the JIT demand signals arrive. Responsive delivery is maintained by purchasing and building long lead time components ahead of the JIT signal.

rapid response assembly



RHYTHM allows suppliers to build buffer stocks in components and assemblies, but postpone most final assembly until after receiving JIT demand signals.

continued

RHYTHM operates as a dynamic system, modeling the entire supply chain, including manufacturing and logistical constraints. Based on variability and volatility, RHYTHM dynamically computes float levels for finished goods, components and raw materials stocks. It employs safety stocks located at cost-optimized points throughout the chain. These "shock absorbers" handle quantity and mix variations.

With RHYTHM, the supply chain is "tuned" for average conditions and responds when confronted with dynamic adjustments. If the plan is disrupted during execution, RHYTHM quickly replans. For instance, a demand forecast, such as an 830 EDI transaction, may trigger recalculation of stocks and manufacturing plans throughout the supply chain. Quick replanning results in an optimized build-to-stock strategy for long lead-time components.

benefits: meeting customer needs with less inventory

RHYTHM offers suppliers a strategy for meeting customer needs with less inventory and resources, leading to a higher return on assets.

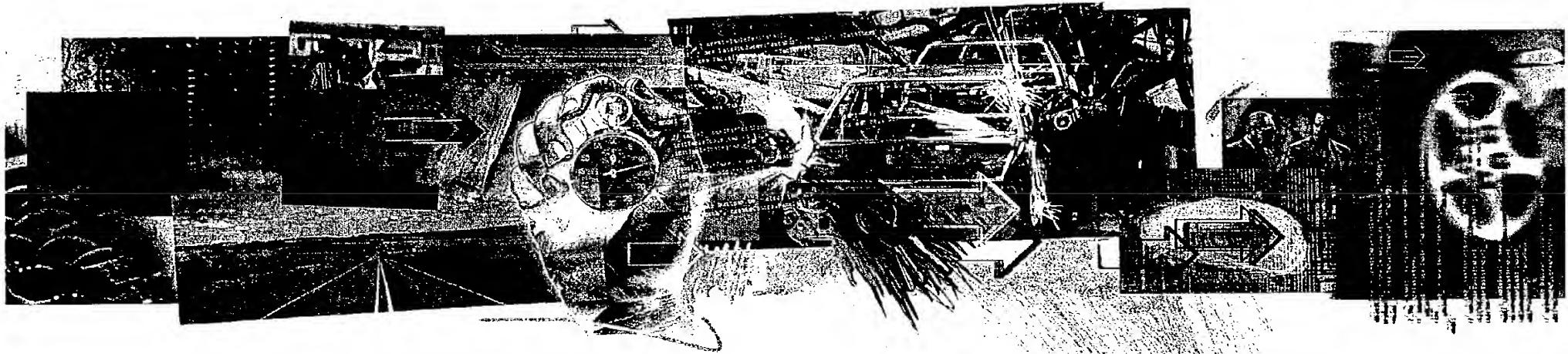
- **reduced inventory**—Assembling the right mix at the latest possible time and optimizing buffer stocks reduces inventory throughout the system, including raw materials, components, and finished goods. One plant reduced inventory levels by more than \$4.8 million with this strategy.
- **optimized throughput**—Optimizing production based on actual constraints maximizes system throughput. Within three months of implementation, one manufacturer improved its orders processed on schedule by 15% and virtually eliminated overbooking.
- **increased asset utilization**—Plant and equipment are used only to produce product for which there is sufficient demand. Floor space demands shrink due to less inventory. For example, a major steel producer reduced inventory demands for floor space by 20% at one facility.
- **decreased discount and incentive costs**—Building the right mix at the right time reduces the need for discount programs to move overbuilt stocks.



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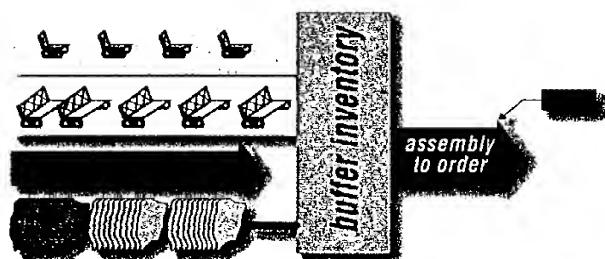
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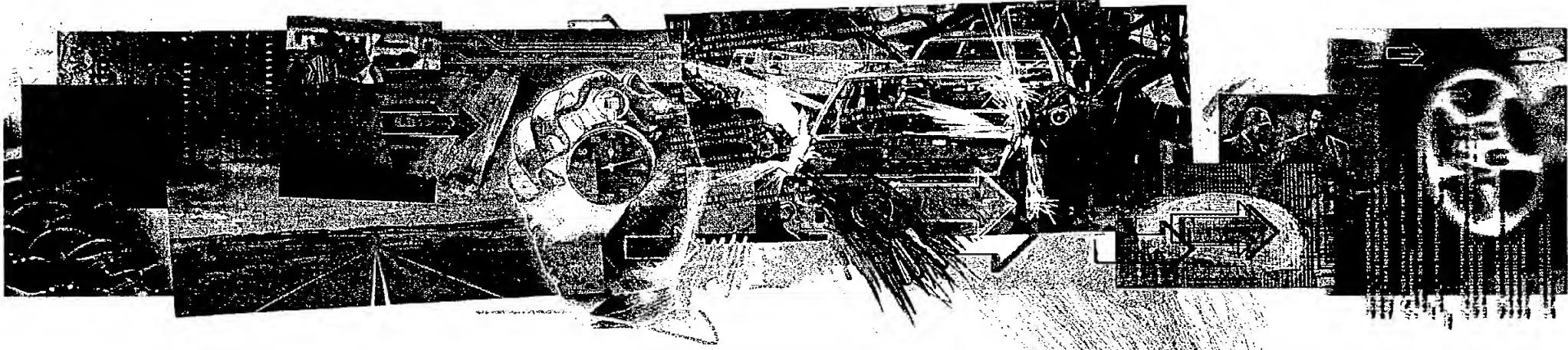
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multi-plant planning



RHYTHM® Multi-plant Planning coordinates complex multi-plant operations, including feeder plants, multi-stage manufacturing and transportation facilities. Using a constraint-based model, it creates a smooth flow of orders between plants, improves utilization of constrained resources, and reduces excess inventory buffers. This model can address hundreds of resources, multiple flow paths between plants, and also outsourced operations.

problem: planning across multiple sites and domains

Lean manufacturing has reduced inventories that once insulated a plant's internal activities from the others. Now, rather than operating in semi-isolation, many production planning problems must be considered as a combination of several plants working together.

Coordinating material flow and planning capacity at a single site is challenging. Coordinating multiple sites together is far more complex. Multiple sites greatly enlarge the size of the problem. They often span distances that impose significant transportation constraints and separate planning authorities. Finally, this complexity is amplified by "mass customization", or producing larger mixes of products in smaller lots with frequent changeovers.

As a result, most manufacturers have taken the approach of locally optimizing individual sites and then trying to coordinate each location. However, this approach often creates significant global problems, including production disruptions and excess inventory.

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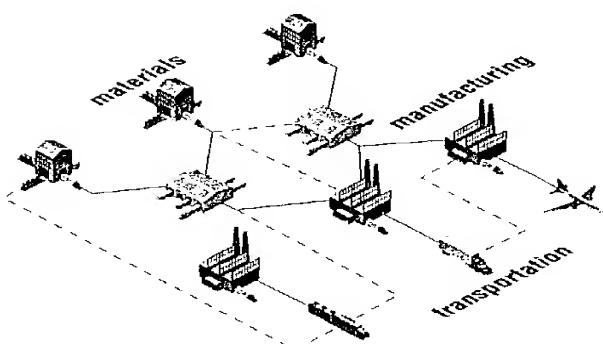
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solution: globally optimized planning

RHYTHM Multi-plant Planning offers globally optimized planning across multiple manufacturing sites, including those with dependent material flows. A memory-resident architecture allows RHYTHM to solve even the most complex constraint-based planning problems in a timely manner. RHYTHM can address variations of possible flow paths, hundreds of resources, and also outsourced operations.

RHYTHM creates a global constraint-based feasible plan that balances and synchronizes the flow of materials, simultaneously considering manufacturing capacity and material. This plan also considers transportation constraints to determine how to maximize the flow of material through the complete network.

RHYTHM identifies "wandering" bottlenecks and launches materials at upstream and downstream operations to pace constrained resources. It coordinates both inside a single plant and between plants that feed one another or pass material back and forth. Material buffers and lead times for entire multi-plant networks are dynamically calculated according to demand volume, demand mix and the existing inventory.



RHYTHM coordinates complex multi-plant operations, including feeder plants and transportation facilities.

benefits:

- **improved asset utilization**—Multi-site optimization creates smoother product flow through the network. This frees up capacity, achieving greater production volumes from the same asset base, and preventing capital expenditures.
- **reduced inventory**—While lean manufacturers have already taken out significant inventories, they have been limited by a local perspective. Global planning coordinates material across the supply network, decreasing buffer inventories often by 25 percent or more.
- **improved schedule reliability**—Stabilizing the multi-site plan and the flow across sites ensures increased internal site stability and schedule reliability. Many customers have seen delivery performance improve by 30 percent or more. This improves operational efficiencies, such as lower expediting and premium freight costs, labor and machine costs.
- **decreased discount and incentive costs**—A well planned supply chain improves responsiveness and closer tracking to actual customer demand, which can decrease over-builds and reduce discounts, to move inventory.

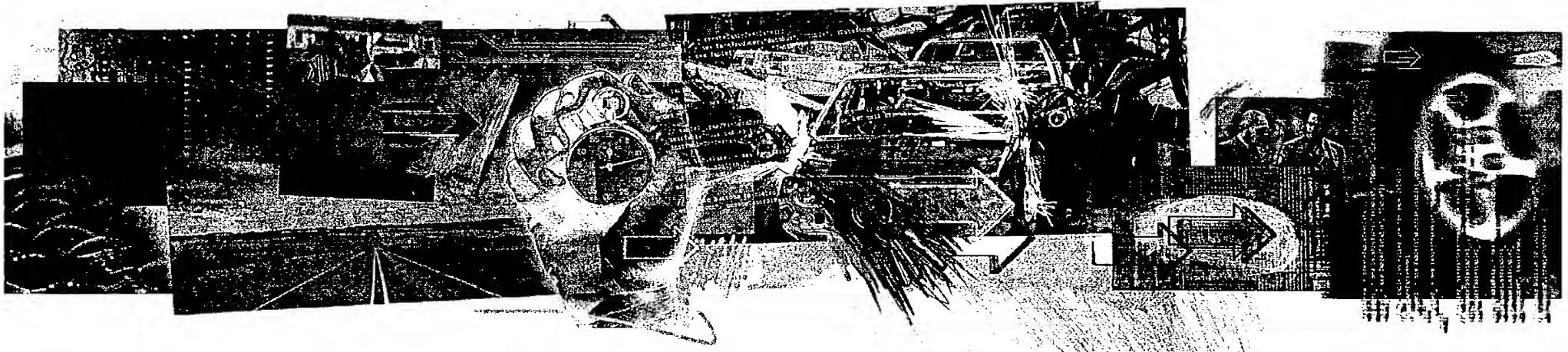

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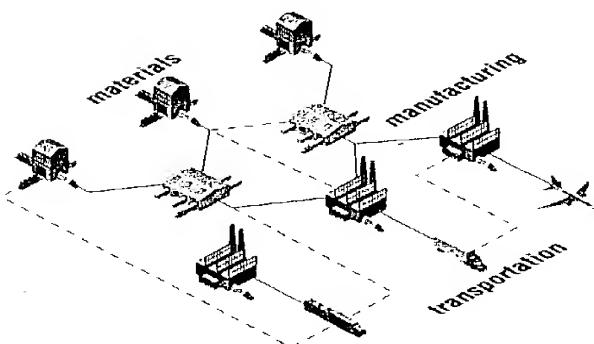
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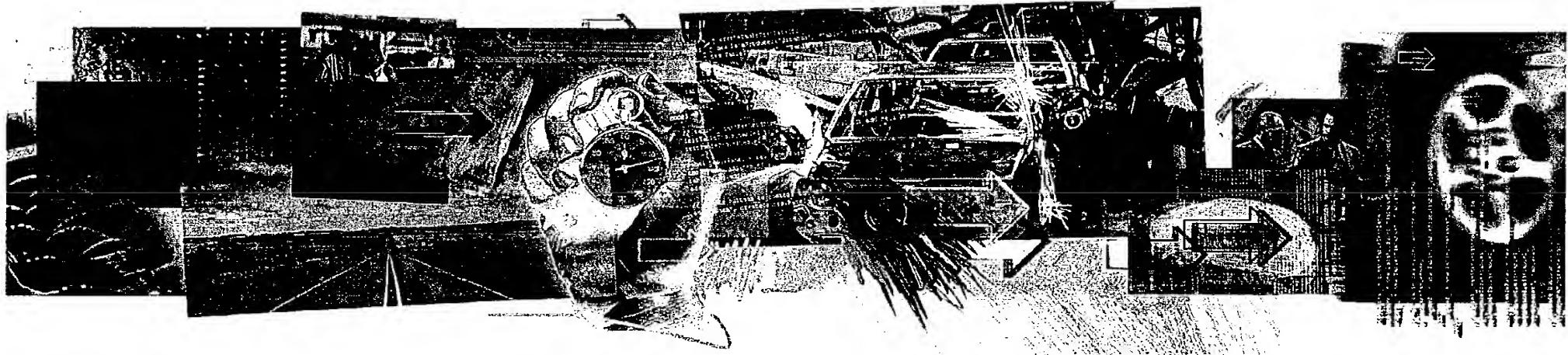
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inbound transportation management



RHYTHM® Inbound Transportation Management enables manufacturers to manage and optimize inbound transportation operations to provide 100% service levels at the lowest possible cost. With this solution, logistics organizations enjoy global visibility of operations, advanced warning, and the ability to respond to problems before they become difficult and expensive to solve. They can optimize shipping plans, monitor scheduled activities, and respond to unexpected events.

problem: avoiding expediting costs

Lean manufacturing has driven excess inventories out of plants, leaving little room for error in delivering critical components. This puts more demands on transportation management. Transportation is more constrained and difficult to optimize, causing inefficiencies that may add up to millions of dollars per year. With little safety stock, transportation problems can also trigger potentially costly delays. The cost of line stoppages is intolerable; up to \$20,000 in lost revenues/minute at vehicle assembly plants. Yet expediting to avoid such delays via emergency and premium freight services is also extremely expensive.

solution: increasing visibility and responsiveness

RHYTHM provides a decision support system that plans and optimizes transportation operations across the supply chain. It employs an advanced architecture for integrating data across different business enterprises. RHYTHM also provides a full spectrum of transportation planning capabilities, ranging from long-range strategic decision making to short-term execution monitoring.

Strategically, RHYTHM models product flows and associated costs, capacities and service constraints along the entire length of the supply chain. This allows planners to evaluate tradeoffs and make good strategic decisions such as identifying the best location and transportation scenario for a sub-system assembly or kitting operation.

A U T O M O T I V E A N D I N D U S T R I A L

inbound transportation management

continued

Operationally, RHYTHM creates executable transportation plans that consider constraints and costs. This includes managing complex logistics scenarios such as multi-tier in-sequence shipping.

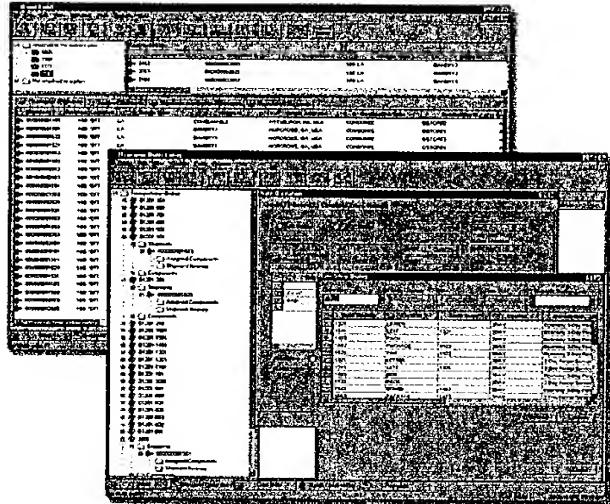
RHYTHM develops transportation plans with data from manufacturing plans and vice-versa. Freight optimization cuts logistics costs and time in accordance with Just-in-Time strategies, including "milk run" route planning. RHYTHM's delivery optimization considers load building rules, alternate routes, alternate modes, consolidation points and cross docking operations.

At execution, RHYTHM offers a command and control capability for monitoring multi-mode, multi-enterprise logistics operations. Logistics managers gain visibility of inventory moving through the supply chain and in-process manufacturing orders. Interactive graphical models monitor and measure the performance of the individual elements of the supply network. Execution failures generate visual alarms. These alarms alert users that the plan is in jeopardy and enable them to proactively analyze alternatives. This ability is particularly useful to companies that have outsourced logistics, but want visibility into operations they don't operate and control.

benefits: improved service while reducing cost

Using RHYTHM, manufacturers can simultaneously maintain or raise customer service levels while reducing total inventories and total costs.

- **reduced transportation and inventory costs**—A customer using i2's cross docking functionality eliminated 10-12% of its total transportation costs and 15% of total inventories.
- **optimized throughput**—A manufacturer reduced by 30% the number of carriers arriving at its receiving dock and significantly reduced in-bound shipment handling costs.
- **increased productivity**—Transportation and logistics functions are executed in a fraction of the time required using manual or spreadsheet methods. One manufacturer reduced total transportation administrative costs by 15%.



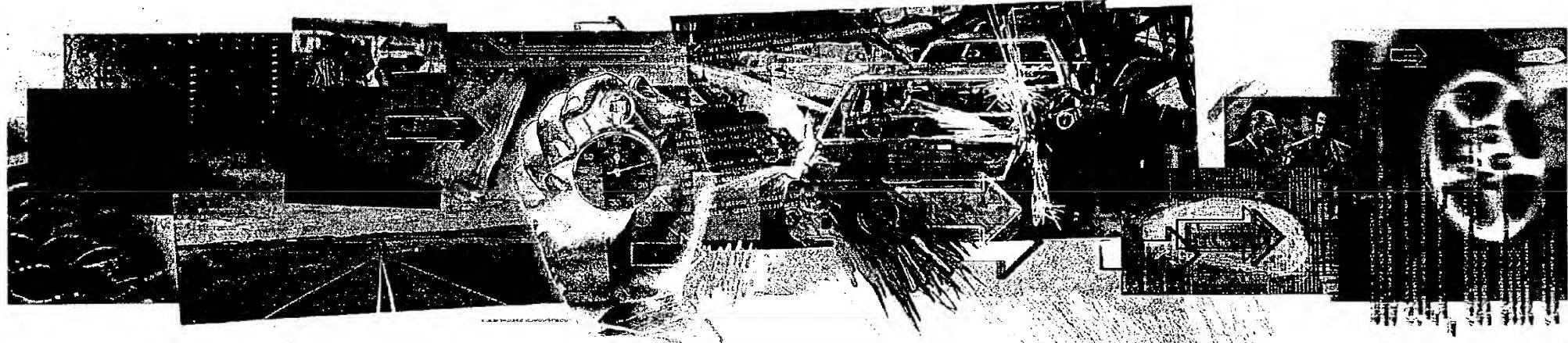
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collaborative demand planning



RHYTHM® Collaborative Demand Planning *enables manufacturers to create more feasible and accurate demand plans by involving the supply chain participants closest to the market. Tight collaboration between manufacturers and distribution channels improves forecasting, planning, and demand management. It also allows manufacturers to shape demand. The result is production plans that more closely match actual orders.*

problem: aligning customer demand with production

As consumers have become accustomed to choosing between a wider variety of competing products and options, they exert greater pressure on manufacturers to deliver the "right" product and configuration at the lowest cost. This creates pressure to efficiently meet market demand, rather than building what the manufacturer can produce and hoping the customer will buy.

Business processes at many OEMs have not evolved to meet these new market requirements. Dealers and other sales organizations are often not directly involved in the planning process. Poor planning helps create excessive and costly dealer stocks that do not meet actual customer demand. Rebates, discounts, and other finance incentives move inventory, but dramatically increase costs and reduce profit margins. Customer satisfaction and market share suffer, despite spending as much as 35% of a vehicle's total cost on marketing and distribution.

the solution: collaborative demand planning

RHYTHM helps provide an accurate demand picture to everyone in the supply chain by involving the organizations closest to the customer in the demand planning process. These organizations include retailers, regions, zones and dealers. RHYTHM provides an integrated environment in which all participants can collaborate to form a consensus.

collaborative demand planning

continued

Each user has the information needed to be an intelligent participant in the process. RHYTHM facilitates effective collaboration by offering the best statistical techniques, what-if scenarios, and the ability to handle unlimited causal factors such as economic conditions, pricing, seasonal fluctuations and competitor activities.

RHYTHM generates and evaluates multiple plans and arbitrates conflicts to create a consolidated plan. National forecasts may be allocated down to individual territories. Forecasts for individual SKUs can be reflected up to product levels. RHYTHM handles multiple dimensions, such as vehicle, option, geography, plants, or distribution centers, allowing users to manipulate data to fit their own business contexts.

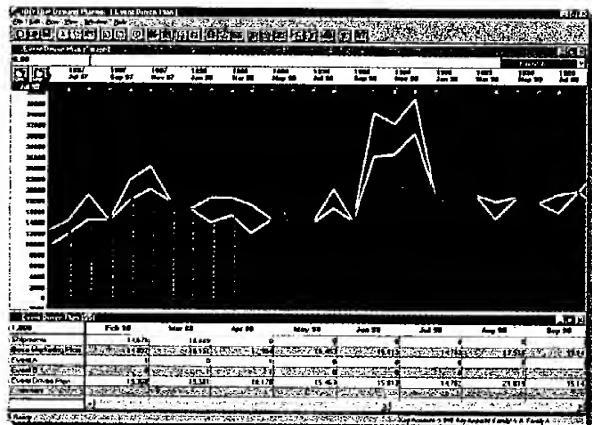
RHYTHM also immediately determines a plan's feasibility by checking manufacturing ability to satisfy the demand. Participants have a clear understanding of both current demand and supply constraints.

Finally, RHYTHM allows manufacturers to shape demand. RHYTHM identifies constraints such as manufacturing capacity and allocates supply according to corporate objectives. With a clear understanding of market demand and constrained supply, planners can effectively shape demand through focused advertisement and incentives. They can develop plans based on various strategies, and then analyze each strategy to determine which best meets their goals.

benefits: filling more orders directly from plan

Collaborative demand planning moves manufacturers closer to an assemble-to-order business environment. More orders are filled directly through the production plan with little or no change. Other benefits include:

- **reduced delivery lead time**—Filling orders out of plan reduces delivery cycle time, increasing sales and improving customer satisfaction.
- **improved schedules**—Better forecasts help improve schedule stability, which reduces inventories and costs for both manufacturers and upstream suppliers. One manufacturer improved statistical demand forecasting accuracy by 3%, creating more than \$3 million in savings in less than one year.
- **increased productivity**—Integrated collaboration reduces the level of effort required to generate highly effective demand plans. One manufacturer reduced global planning cycle time from 28 to 14 days, and is moving to just 5 days.



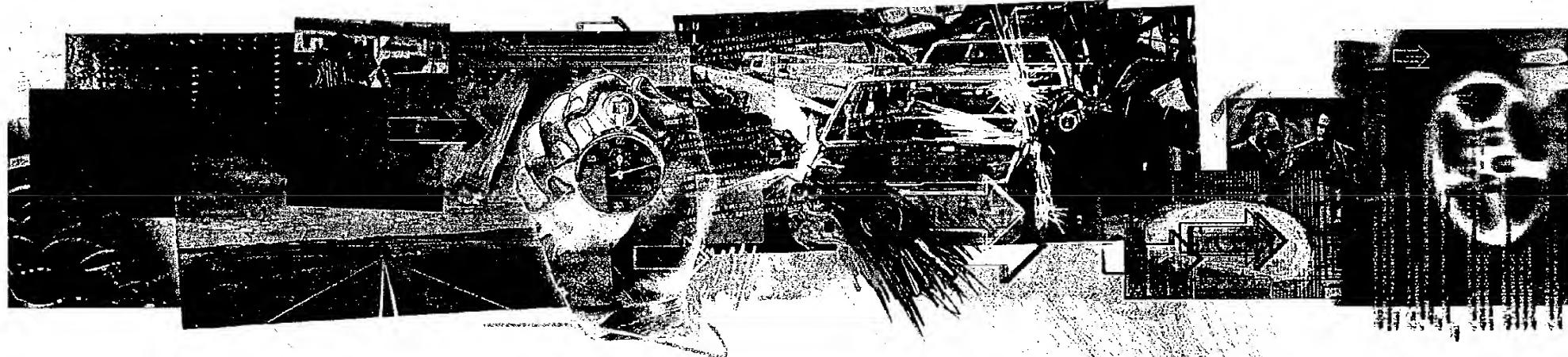
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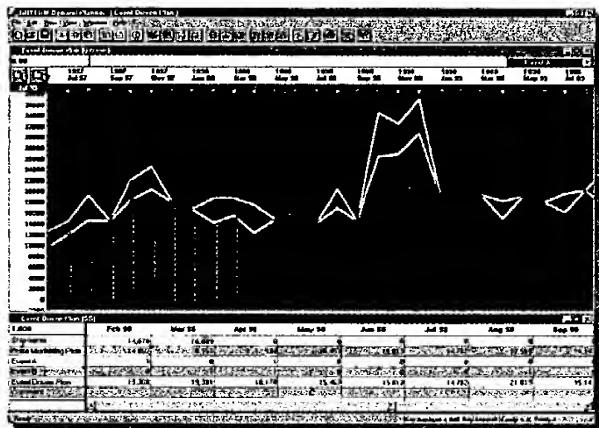
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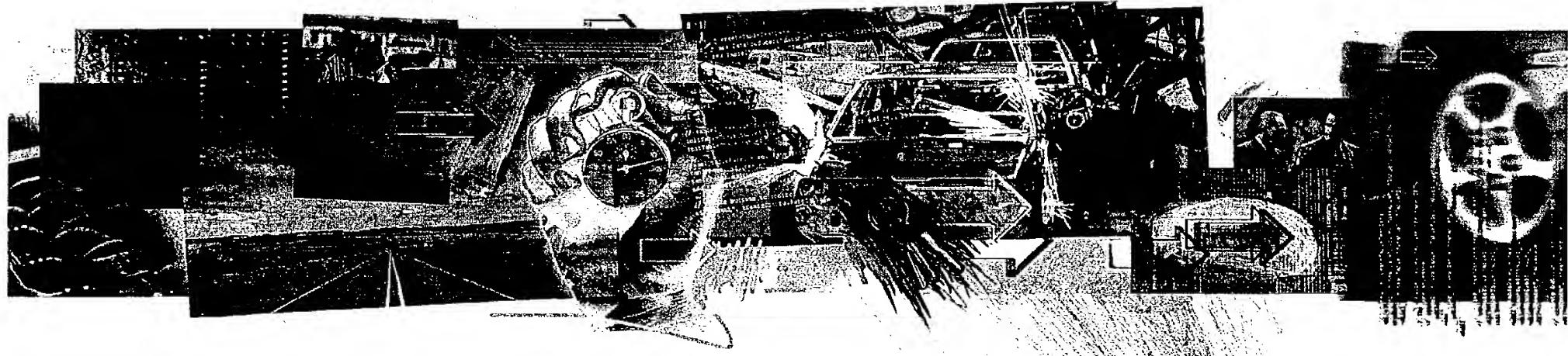
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assembly sequencing with supplier integration



RHYTHM® Assembly Sequencing enables manufacturers to generate optimized assembly sequences tightly integrated to in-house feeder operations and outside suppliers. This solution optimizes assembly throughput and rapidly resequences assembly in response to production interruptions. Typical applications include sequencing assembly of vehicles, heavy equipment, and complex assemblies such as engines or transmissions.

problem: managing increased complexity

Lean manufacturing and mass customization demand more flexible and responsive manufacturing practices. Factories are building a wider variety of models with more product variations. Yet they must meet these additional demands using the same resources and equipment. Many manufacturers are offering shorter delivery times, and even running their plants based on actual orders, rather than forecasts alone.

Production scheduling in this environment can be complex. The large number of product options and manufacturing constraints makes it hard to generate feasible, yet alone optimal, schedules. Labor on the line needs to be balanced. Paint booth changeovers must be minimized. Shipping and logistics requirements must be synchronized with line sequences. This often results in missed deliveries, long lead times, and high production costs.

solution: global sequencing and resequencing

RHYTHM offers sequencing and resequencing that automatically creates optimized assembly line schedules. Optimizing the build sequence increases throughput, balances workloads, and achieves other related goals. RHYTHM understands and weighs all relevant manufacturing constraints such as changeover constraints, line spacing, load building, and component availability. RHYTHM even ensures a globally optimized schedule by considering constraints in feeder operations, component plants and suppliers.

assembly sequencing with supplier integration

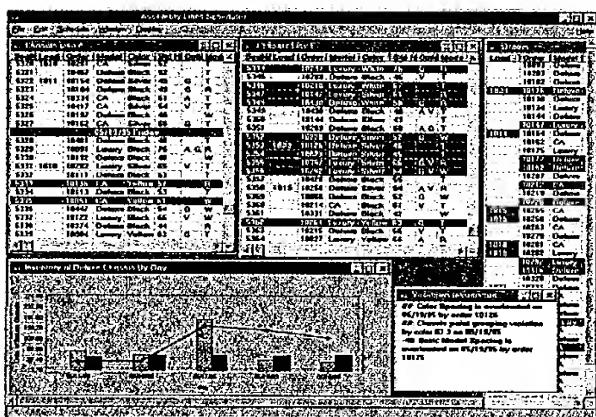
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RHYTHM tightly synchronizes all production operations. It communicates optimized assembly schedules to upstream suppliers, creating a pull-based workflow throughout the supply chain. By globally representing supplier and logistics constraints, RHYTHM enables more reliable and efficient integration with key suppliers.

When production interruptions occur, RHYTHM rapidly resequences assembly. RHYTHM helps manufacturers perform "crisis management" by giving schedulers time to react to missing parts, quality problems, equipment downtime, or the sudden need to expedite a unit. Constraint violations are color highlighted on the schedule and explained in natural language. Drag-and-drop schedule editing allows schedulers to quickly perform "what if" analysis and schedule updates. RHYTHM also helps schedulers manage set-ins and set-outs, part outages, and the expediting process. The net result is fewer open slots that reduce throughput.

benefits: optimized throughput with less inventory

- **reduced inventory**—Closely tying the build schedule to shipping requirements dramatically reduces finished goods inventories. One heavy equipment OEM eliminated hundreds of millions of dollars of dealer stock.
- **optimized throughput**—Optimized scheduling increases factory throughput. Rapid resequencing closes gaps and uses all assembly slots. One plant increased output nearly 15% with the same labor and equipment.
- **improved schedule reliability**—Because the system creates realistic schedules respecting all constraints, manufacturers see an immediate improvement in on-time schedule reliability. One manufacturer's ability to meet promised customer delivery dates improved within months from 20% to more than 99% reliability.
- **decreased costs**—Supply chains become more reliable and efficient as manufacturers and suppliers become more tightly integrated. Typical results include reduced supplier costs and an improvement in first-pass yields.
- **increased productivity**—Scheduling and rescheduling is performed in a fraction of the time required using manual or spreadsheet methods. For example, an engine manufacturer reduced the time to create a build schedule from more than a day to less than half an hour.



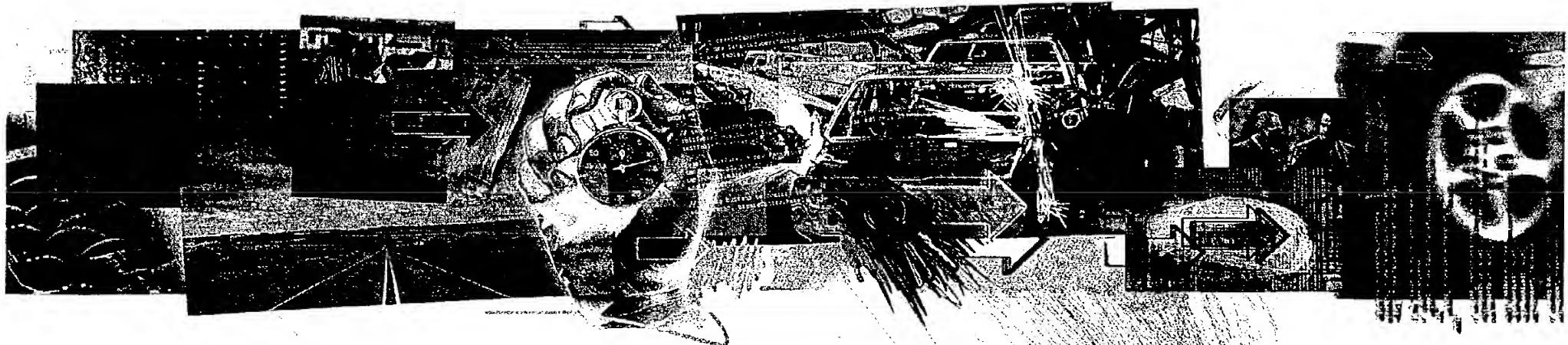
RHYTHM enables the user to interactively perform "what-if" analysis on the optimized schedule, and instantly checks to see if any constraints were violated.

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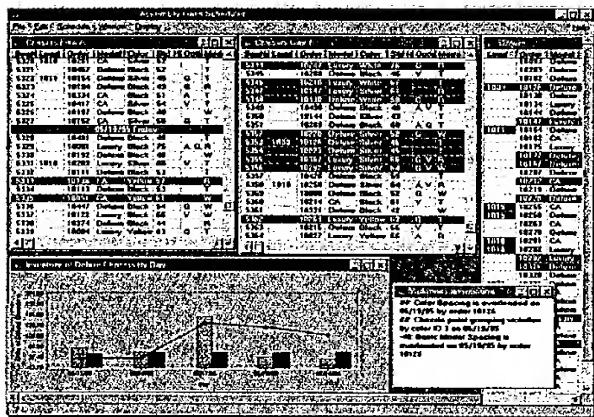
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